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# **The Year in Review:**

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## **Foreign Comparative**

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### **Testing Program**

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#### **Fiscal Year 2002**

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April 2003

Deputy Under Secretary of Defense  
(Advanced Systems and Concepts)

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## **FOREWORD**

Authorized by Congress since 1980, the Foreign Comparative Testing (FCT) Program is a key acquisition tool for the U.S. Department of Defense. FCT puts the world's best equipment in the hands of our operational forces, while strengthening defense relationships through international armaments cooperation. The \$6 billion in U.S. procurements resulting from the FCT program clearly demonstrates both the U.S. commitment to the "two-way street" in defense procurement and the willingness of our allies and friends to share their technology and to compete in the U.S. defense market.

The success of the FCT program relies upon recognition by the U.S. military of the value of this world-class equipment and dedicated work by test teams in evaluating the equipment and ensuring its safe, effective integration into U.S. systems and inventories. Recent FCT projects contribute to several major U.S. programs: for example, the Marine Corps' Advanced Amphibious Assault Vehicle and the Army's RAH-66 Comanche Helicopter and Infrared Systems Horizontal Technology Integration programs. Other FCT successes provide critical mission capabilities for chemical/biological agent detection, protection, and decontamination; safe escape from disabled submarines; increased individual firepower; deployable satellite data receiving and processing for mission planning; and intrusion detection.

Notable accomplishments during FY 2002 include:

- Twenty-four items completing test and evaluation. Sixteen of these met Service or U.S. Special Operations Command requirements. Seventeen first-time procurements valued at \$57 million were initiated in FY 2002 (a new record), some resulting from projects completed in prior years. Follow-on procurements from previous successes totaled \$222 million.
- Two top acquisition awards from the Under Secretary of Defense (Acquisition, Technology & Logistics). The *David Packard Excellence in Acquisition Award* was won by the U.S. Special Operation Command FCT project team who tested the AT-4 Confined Space shoulder-fired weapons and upgraded ammunition for the 84 mm Multi Role Anti-Armor Anti-Personnel Weapon; the *Defense Acquisition Excellence Award* was won by the Naval Air Systems Command FCT project team who tested the Erosion-Resistant Coating for jet engine compressor blades.

In addition, this year the FCT Program was realigned under the Deputy Under Secretary of Defense (Advanced Systems & Concepts) within the Office of the Under Secretary of Defense (Acquisition, Technology & Logistics).

The FCT program has provided world-class equipment to U.S. warfighters over the past twenty-four years; its work is evident today in our fight against terrorism. I am enthusiastic about the future of FCT in the Advanced Systems and Concepts organization in OSD and am pleased to sponsor this Fiscal Year 2002 Year in Review.



Sue C. Taylor  
DUSD/AS&C

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**OVERVIEW OF THE FOREIGN COMPARATIVE TESTING (FCT) PROGRAM**

The Foreign Comparative Testing (FCT) Program<sup>1</sup> supports the warfighter by leveraging non-developmental items (NDI) from allied and friendly nations to satisfy U.S. defense requirements, thereby accelerating the U.S. acquisition process and lowering development costs. The Deputy Under Secretary of Defense (Advanced Systems and Concepts) administers the FCT Program within the Office of the Under Secretary of Defense (Acquisition, Technology and Logistics).

The FCT Program reduces by an average of 5½ years the acquisition cycle time for fielding world-class systems and equipment compared to similar U.S. development programs. Many FCT projects have reduced total ownership costs of military systems, cutting overall acquisition and support expenditures while enhancing standardization and interoperability, improving allied cross-service support, and promoting international cooperation.

Each year the Military Services and U.S. Special Operations Command nominate candidate projects to the Office of the Secretary of the Defense (OSD) for funding consideration. The proposals are evaluated to ensure that: (1) the proposed non-developmental item addresses valid DoD requirements; (2) a thorough market survey was conducted to identify all potential candidates; and (3) the sponsoring organization has developed a viable acquisition strategy to transition the item to the U.S. warfighter. The highest priority for funding is given to projects with the intent to procure if the item meets requirements and provides best value. A lower priority is given to proposals to evaluate foreign technologies when there is no immediate, funded intent to procure after a successful FCT evaluation.

OSD evaluates and prioritizes the candidate proposals and notifies Congress of its intent to fund the new and continuing projects in the coming year. The sponsoring organization obtains and tests the items selected for evaluation, and procures those that meet requirements and provide best value. Approved projects are normally funded for one or two years. Forty-eight projects were funded by OSD in the FY 2002 FCT Program – 16 new-starts and 32 continuing from previous years.

The *Foreign Comparative Testing Program Handbook*<sup>2</sup> contains further details on the program and describes how successfully to manage an FCT project, from the initial proposal phase through procurement.

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<sup>1</sup> The FCT Program is authorized by Title 10, United States Code, Section 2350a(g). Further guidance is found in the DoD FAR Supplement which addresses the acquisition and distribution of commercial and non-developmental items.

<sup>2</sup> For additional information concerning this report or to obtain a copy of the Handbook, contact the FCT Program Manager by e-mail ([Rockford.Reiners@osd.mil](mailto:Rockford.Reiners@osd.mil)), see the FCT Home Page at <http://www.acq.osd.mil/fct/>, or write to OSD(AT&L)/AS&C/FCT, 3700 Defense Pentagon, Room 3E144, Pentagon, Washington, DC 20301-3700.

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### FCT PROGRAM ACHIEVEMENTS

The Services and U.S. Special Operations Command initiated 452 projects under the FCT Program since its inception in 1980, with 44 projects still open. Of the 408 projects completed through FY 2002, 219 resulted in successful evaluations meeting the sponsor's requirements; and of these, 146 – 66 percent – resulted in military procurements of non-developmental items worth \$6 billion.<sup>3</sup> Over the same period, the program achieved an estimated Research, Development, Test and Evaluation cost avoidance of about \$4.3 billion. Leveraging the defense investments of our allies and friends reduces our total ownership costs. For example, the Army this year procured the High Mobility Engineer Excavator from the Australian Defense Industries/Oshkosh Truck Corporation partnership and avoided about \$5 million in development costs, and the Air Force's accelerated fielding of the French Aératur Retractable Arresting Cable System avoided \$10 million in development costs, with an anticipated production cost savings of \$3 million. Overall, the estimated U.S. developmental cost avoidance from FY 2002 first-time procurements is \$129 million. More recently, the FCT team has been more selective in choosing items for evaluation that have a high potential for meeting DoD requirements and being procured. This focus has increased the recent procurement rate to nearly 4 out of 5 for those items that met the requirements. The FCT Program:

- Contributes to international armaments cooperation
- Facilitates rapid fielding of critical equipment
- Generates operational cost savings
- Improves and introduces new operational capabilities
- Reduces acquisition costs by avoiding new-start developments
- Reduces risk in major U.S. development programs
- Creates opportunities for industry teaming and production in the U.S.

#### ❖ International Armaments Cooperation

The FCT Program supports the U.S. policy of international armaments cooperation by providing tangible evidence of America's commitment to the "two-way street" in defense procurement. FCT fosters an environment that helps both foreign and U.S. vendors sell in the global marketplace. Initial procurements in FY 2002 from countries such as Australia, Germany, Sweden, the Republic of South Africa, and the United Kingdom totaled over \$27 million. Follow-on procurements as a result of previous successful FCT projects totaled \$222 million in FY 2002. The FCT Program has broadened the cooperation arena through in-country visits and



briefings to foreign industry, encouraging the defense industrial participation of new NATO members Poland, Hungary, and the Czech Republic. As a result, Poland is participating in the FCT Program for the first time in FY 2003, with the evaluation of *PZL-Swidnik's Replacement Structures for Navy Aircraft*. Similarly, FCT has cultivated relationships in the Pacific region with Singapore, India, and the Republic of Korea. This outreach resulted in the first participation by the Republic of

Singapore's defense industry in the FY 2002 program, with the Army evaluation of *Chartered Ammunition Industries' Dud-Reducing Fuze for 40mm Cartridges*. Appendix A details participation in the FCT Program by country. Appendix B lists the equipments selected for procurement as a result of successful FCT projects.



<sup>3</sup> In constant FY 2002 dollars.



### ❖ Rapid Fielding of Critical Items

The FCT program's focus on non-developmental items, coupled with a clear path to procurement, quickly puts needed equipment into the hands of America's warfighters. The importance of responding rapidly to our nation's immediate warfighting and peacekeeping requirements has been underscored by Operation Desert Storm; the enforcement of UN sanctions on Iraq; U.S. and coalition operations in Somalia, Bosnia, Kosovo, and Macedonia; and Operations Enduring Freedom, Iraqi Freedom, and Noble Eagle. The FCT program has demonstrated the ability to test, evaluate, and facilitate the procurement of systems quickly for use in such critical missions



during war and other operations, such as peacekeeping and military operations in urban terrain. The Air Force's *Eagle Vision Deployable Satellite Ground Station* receives and processes commercial imagery in near real-time for intelligence, mission planning, and operations. The U.S. Special Operations Command rapidly tested, qualified, procured, and deployed a new *5.56mm Lightweight Machine Gun*, developed by FN Herstal of Belgium, that increases the organic firepower of SEAL teams. The "*Deco-Fogger*" and "*Cobra*" *Decontamination Equipment*, developed by Odenwald Werke of

Germany, first identified by the Air Force for possible decontamination of the interiors of large aircraft, was rapidly tested by the U.S. Special Operations Command, and fielded to meet urgent Special Forces needs for Operations Enduring Freedom and Iraqi Freedom.

### ❖ Operational Cost Savings

Many of the items or technical processes acquired as a result of the FCT Program cost less to maintain and are more efficient than the items they replace. For example, by the end of Operation Desert Storm in 1991, the MH-53 Sea Stallion helicopter fleet was nearly grounded when severe sand erosion on the T-64 engine compressor blades resulted in premature engine removals. Excessive wear reduced the blades' operational life from the designed 2500 hours to an average of 100 hours. FCT funded the test and evaluation of a *Titanium-Nitride Erosion-Resistant Coating Process* developed by the Ural Works of Civil Aviation (PRAD) of the Russian Federation through a joint venture with MDS Aero Support Corporation of Canada. The first production shipment of 3,273 T64 engine blades, coated at the



MDS-PRAD Technologies facility in Montreal and at PRAD's facility in Ekaterinburg, Russia, was recently delivered to General Electric Aircraft Engines. The Navy predicts the process will



double or triple the operational life over that of uncoated blades and yield annual savings above \$1.6 million. Other examples of FCT-generated savings are the Air Force's procurement of the French AérAzur *Emergency Aircraft Arresting System*, yielding \$6 million in life-cycle cost savings over the previous BAK-12 units, and the estimated \$50-\$150 million in life-cycle cost savings attributed to incorporation of the Navy's *Digital Flight*

*Control System for the F-14 Tomcat* aircraft. The system, developed by GEC Avionics (now BAE Systems) of the United Kingdom, solved an uncontrollable flat-spin problem on aircraft equipped with the old analog flight control systems identified as causal in 35 aircraft losses.

### ❖ Improved and New Operational Capabilities for U.S. Forces

FCT continues its impressive track record of providing items that meet an array of warfighter needs, supporting all Services and the U.S. Special Operations Command. Capabilities encompass advanced weather forecasting, satellite imaging, chemical and biological detection and protection equipment, landmine detection and clearing, submarine escape, mobile electric power generators, advanced direct-fire weapons and ammunition, Global Positioning System improvements, and many others. The Navy's qualification of the Beaufort Air-Sea Equipment, Ltd. ***MK10 Submarine Escape and Immersion Equipment*** for backfit on all U.S. submarines introduced a dramatic improvement over the Steinke Hood escape systems they are replacing, increasing the capability for safe escape from a depth of 350 feet to 600 feet, while reducing the overall risk of injury to escapers from disabled submarines at all depths. FCT tested and procured the ***Automatic Chemical Agent Detector Alarm (ACADA)***, and ***Improved Power Supplies for ACADA***, developed by Graseby (now Smiths Detection) of the United Kingdom, that now provides perimeter support at high value locations, such as the Pentagon. The Australian Defense Industries ***High Mobility Engineer Excavator Vehicle***



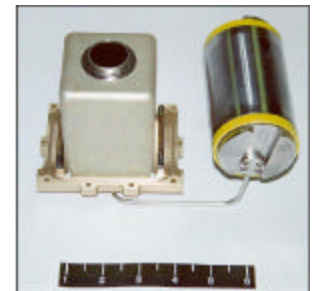
provides the first high-speed, all-terrain engineer vehicle that can keep up with our mobile combat forces. In addition to providing new capabilities, FCT successes improve current capabilities and help support increased operational readiness and tempo. The recent introduction of the Ultra Electronics ***High Pressure Pure Air Generator (HiPPAG)*** into the Navy's F/A-18 E/F aircraft provides unlimited cooling of infrared missile seekers, making the missile available for combat engagement at any time during a flight mission. The previous



method of cooling missile seekers with nitrogen bottles limited missile availability to 1.5 hours. Bottle replacement required the wings to be folded down, within reach of maintenance crews, and then pushed back to the folded position, a dangerous and arduous task on a carrier flight deck. The HiPPAG virtually eliminates seeker cooling maintenance as it requires only a 2-minute filter change every 1,000 cycles. Appendix C notes further examples of FCT-evaluated equipment that improved operational capabilities for U.S. forces.

### ❖ Avoiding New-Start Development

The FCT Program reduces overall DoD acquisition costs by promoting the procurement of non-developmental items. The evaluation of NDI reduces expenditures for research and development. Procuring an item already in production can lower the unit procurement cost for both the U.S. and the host nation's defense. The competition of foreign vendors often lowers acquisition costs and improves warranties or contractual guarantees from both U.S. and foreign vendors. Successes include ***SOFRADIR's Standard Advanced Dewar Assembly (Type II)*** developed in France, and ***AEG Infrarot Modules One Watt Linear Drive Coolers*** from Germany, which are used in the Army's Second-Generation Forward Looking Infrared sensors for the Bradley Infantry Fighting Vehicle, Abrams M1A2 Main Battle Tank System Enhancement Program, and the line-of-sight antitank (LOSAT) system. Successful FCT testing of foreign sources in these major acquisition programs allowed Army program managers to decrease cost and reduce risk while promoting efficiencies in domestic vendors and providing second sources for critical leap-ahead technologies. Appendix D provides examples of development cost avoidance from successful FCT evaluations.



## ❖ Risk Reduction in Major U.S. Development and Upgrade Programs



The FCT program has reduced technical, cost, and schedule risk for several major U.S. development and upgrade programs. For example, the Marine Corps' Advanced Amphibious Assault Vehicle (AAAV) program avoided more than \$20 million in research and development (RDT&E) costs, and potentially \$2 million in production costs, when candidates from Raufoss of Norway and Mauser of Germany for the **30mm Armor-Piercing Fin-Stabilized Discarding Sabot-**

**Tracer (APFSDS-T)Round** met the firepower requirements for System Development and Demonstration. The two-year test and evaluation success saved the AAAV program an estimated 10- to 12-year development effort. The AAAV has sponsored five other FCT projects to evaluate critical components for the vehicle. The **Honeywell-NormalAir-Garrett Generic Molecular Sieve Oxygen Generating System** from the United Kingdom was qualified by the Navy in 2001 as a potential competitor for installation in the Joint Strike Fighter program. This successful FCT qualification of a second oxygen generation system manufacturer is projected to achieve development cost avoidance of \$30 million and substantial direct production and life-cycle cost savings.



## ❖ Teaming Opportunities for U.S. and Foreign Industry

FCT projects often result in foreign-U.S. industry teaming. These teaming arrangements include marketing agreements and licensed production of the foreign item in the United States upon successful FCT project completion. This strengthens the U.S. industrial base creating American jobs and improving the "two-way street" while helping U.S. domestic defense industries to sell their products overseas. FCT teaming and manufacturing arrangements have benefited 25 states, 43 cities, and more than 40 company branches across a broad spectrum of industries including electronics, textiles, heavy equipment, and ammunition. As a result of the FCT Program, in 2001 the Air Force awarded a contract worth \$453 million to Static Engineering of Australia and their U.S. partner, FMC Corporation, to produce the **Halverson Cargo Loader** in three U.S. states. The procurement in 2001 of the **Swedish BOL Countermeasures Dispenser** for Navy and Air Force aircraft resulted from teaming



between Sweden's Saab Tech (formerly the Celsius Group), Alloy Surfaces of Chester Township, Pennsylvania (a U.S. company, now a division of the Chemring Corporation of the United Kingdom), and BAE Systems North America in Austin, Texas. The BOL dispenser is installed on Navy F-14s, and Air Force and Air National Guard (ANG) F-15s and is under consideration for Air Force F-16 employment. The ANG's integration of the **Danish Pylon Integrated Dispensing System** and **Electronic Warfare Management System for the F-16** benefited from a partnering agreement with Terma A/S of Denmark, Lockheed-Martin of Fort Worth, Texas, and Northrop Grumman of Linthicum, Maryland. Appendix D lists other examples of teaming opportunities resulting from the FCT Program.



### **HIGHLIGHTS OF THE FY 2002 FCT PROGRAM**

**Projects Completed in FY 2002.** Twenty-four FCT projects completed test and evaluation in FY 2002. Of the 24 completed projects, 16 met Service or U.S. Special Operations Command requirements. Procurement has resulted from 9 of these successful projects, with procurement decisions/actions on the remaining 7 expected during FY 2003. Table 1 lists all of the projects completed in FY 2002.

**Table 1. PROJECTS COMPLETED IN FY 2002**

<b>Sponsor</b>	<b>FCT Project</b>	<b>Country</b>	<b>Start Year</b>
USMC	Aluminum Roadwheels for AAAV	United Kingdom	1999
Army	Antenna Mast for Tactical Mobile Communications	Finland, France, Italy, Sweden, United Kingdom	2001
SOCOM	Chemical Protective Gloves	Canada	2001
USMC	Combat Vehicle Troop Seat	Sweden	2000
Navy	Expeditionary Airfield Light-Duty Mat System	France	2001
Army	High Mobility Engineer Excavator	Australia, Germany	2001
USMC	High Performance Hydraulic Pump	Germany	2000
Army	Improved Battery Cells	Canada, Taiwan	1999
Air Force	Infrared Flare for C-17 Aircraft	Germany	1996
Navy	Joint Protective Aircrew Ensemble	Germany	2000
SOCOM	Joint RAAWS Ammunition Upgrades-II	Sweden	1997
Air Force/SOCOM	Man-Portable Decontamination Equipt./ Large Aircraft Interior Decontamination	Germany	2000
Army	Less Sensitive RDX	France	2000
Air Force	Micro-Satellite for Space Experiments	United Kingdom	1997
SOCOM	Muzzle Brake/Suppressor for M4 Carbine	Switzerland	2001
SOCOM	Patrol Coastal Decoy System	United Kingdom	1998
SOCOM	Personal Temperature Regulation System	Germany	2001
Air Force	Retractable Arresting Cable System	France	2000
Air Force	Space-Qualified Digital Signal Processor	Austria, France	2000
Navy	Stealth Screen System	France	1999
Navy	Supersonic Target Missile	Russia	2000
Air Force	Unattended Ground Imager	Israel	2001
Navy	VLF/LF Composite Bushing Replacement	Switzerland	2001
Air Force	Wind Tunnel Internal Force Balance	France, Germany, Netherlands, United Kingdom	2000

**First-Time Procurements.** The projects listed in Table 2 (some of which were completed in prior years) resulted in first-time procurements by the Services and U.S. Special Operations Command in FY 2002, valued at \$57 million.

**Table 2. FY 2002 FIRST-TIME PROCUREMENTS OF FCT-EVALUATED PRODUCTS**

Service	FCT Project	Country	Vendor	Value (\$M)
USMC	40mm Practice Cartridge (MK281 Mod0)	Germany	NICO Pyrotechnik	3.50
SOCOM	Advanced Demolition Weapons (AT4-CS) (urgent procurement for Operation Enduring Freedom. FCT project continuing)	Sweden	Saab Bofors Dynamics	0.25
Army	Afocal Assembly for HTI B-Kit	UK	GEC Marconi (BAES)	2.75
USMC	Aluminum Roadwheels for AAAV SDD	UK	GKN	1.34
Navy	Anti-Jam GPS Antenna (procured by Army for Comanche EMD)	UK	Raytheon Systems, Ltd.	0.74
USMC	Expeditionary Airfield Light Duty Mat	France	Deschamps	0.70
Army	High Mobility Engineer Excavator	Australia	Australian Defense Industries	15.25
Navy	Joint Protective Aircrew Ensemble	Germany	Blucher GmbH	0.60
SOCOM	Joint RAAWS Ammunition Upgrade-Phase II (HEDP-502-IM, HE-441D-RS, ADM-401 Rounds)	Sweden	Saab Bofors Dynamics	12.58
SOCOM	Large Aircraft Interior Decontamination	Germany	Odenwald-Werke Rittersback	1.80
Army	Mine-Protected Clearance Vehicle	South Africa	Denel Mechem (with Technical Solutions Group of the U.S.)	6.56
Army	Optically-Improved Standard Advanced Dewar Assembly-Type II (FCT project continuing)	France	SOFRADIR	3.80
SOCOM	Patrol Coastal Decoy System	UK	ML Aviation	0.13
Air Force	Retractable Arresting Cable System	France	Aérazur	0.23
Army	Scanner Assembly for HTI B-Kit	UK	GEC Marconi (BAES)	2.75
Navy	Stealth Screen System	France	ACH Engineering	1.4
Navy	Titanium Nitride Erosion-Resistant Coatings for Compressor Blades (production start-up and final qualification)	Russia - Canada	MDS PRAD Technologies Corp.	2.99

**Follow-On Procurements.** Follow-on procurements in FY 2002 worth \$222 million stemmed from prior year FCT successes. These items are listed in Table 3.

**Table 3. FY 2002 FOLLOW-ON PROCUREMENTS OF FCT-EVALUATED PRODUCTS**

Service	FCT Project	Country	Vendor	Value (\$M)
Army	7.62mm Short Range Training Ammunition	Canada	SNC Technologies	0.29
Joint Services	Automatic Chemical Agent Detector Alarm (ACADA) and ACADA Power Supplies	UK	Smiths Detection (Graseby Dynamics)	28.29
Army	Anti-Riot Grenade for LVOSS	UK	PW Defence, Ltd.	0.76
Navy	Atmospheric Diving Suit (Newtsuit)-ADS 2000 Final Certification	Canada	OceanWorks International Corp.	7.70
Air Force	Eagle Vision Deployable Satellite Data Ground Station	France, Canada, India	EADS (Matra CAP)	22.50
Air Force	Electronic Warfare Management System	Denmark	Terma	9.75
Air Force	Emergency Aircraft Arresting System	France	Aérazur	0.70
Air Force	Emergency Evacuation Hyperbaric Stretcher	UK	SOS, Ltd.	0.27
Navy, Air Force	BOL Countermeasures Dispenser, Chaff Expendables for F-14, BOL-IR for F-15A/B	Sweden, UK	Saab Avionics, Chemring, Ltd. With Alloy Surfaces (U.S.)	9.00
Army	Ground & Vehicle Mounting System	Germany	Sachtler GmbH	6.92
Army	Gun Laying and Positioning Systems	Switzerland	Leica Heerbrugg	11.40
SOCOM	Gunfire Detection System	France	Metravib	3.57
USMC	High-Pressure Pure Air Generator for USMC AV-8B and UH-1	UK	Ultra Electronics	3.65
Navy	High Pressure Pure Air Generator for F/A-18E/F	UK	Ultra Electronics	3.59
Air Force	Infrared/UV Threat Stimulator	UK	Elettronica Defense, Ltd.	0.48
SOCOM	Joint RAAWS Ammunition Upgrade-Phase I (HEAT 551C-IM, TPT 141)	Sweden	Saab Bofors Dynamics	1.65
Army	Less Than 3Kw Generator Sets for Mobile Electric Power	Canada	Mechron Energy, Dewey Electronics (U.S.)	5.97
Air Force	Next-Generation Small Loader	Australia	Static Engineering	75.00
Army	One-Watt Linear Drive Cooler	Germany	AEG Infrarot	1.84
Navy	Passenger Anti-Exposure Survival Suits	UK	MultiFabs Survival	0.08
Army, USMC	Powered Multi-Fuel Burner	Canada	International Thermal Research	10.05
Navy	Submarine Escape and Immersion Ensemble	UK	Beaufort Sea-Air and Hale Hamilton	3.38
Army	Ultra Lightweight Camouflage Screening Nets	Sweden	Saab Barracuda w/Saab Barracuda LLC of U.S.	10.00
Air Force	Uncooled Thermal Imager	Sweden	FLIR Systems	4.89

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**PROJECTS COMPLETED IN FY 2002****Aluminum Roadwheels for Advanced Amphibious Assault Vehicle — United Kingdom – U.S. Marine Corps**

This project evaluated a lightweight aluminum roadwheel for the Marine Corps' Advanced Amphibious Assault Vehicle (AAAV), a modified version of the roadwheel manufactured by GKN for the British Warrior Armored Personnel Carrier. The design is significantly lighter than the current AAAV roadwheel; reduced weight at an acceptable durability and cost was the project objective. The Marine Corps Program Office procured 300 roadwheels valued at \$600,000 for testing on the AAAV prototypes at the AAAV Technology Center, Woodbridge, Virginia, and at Aberdeen Proving Ground, Maryland, with positive results. System Development and Demonstration is now underway, with 316 roadwheels worth \$370,000 procured, and plans for an additional 1,274 units worth \$972,000. Because weight is critical on the AAAV, a reduction in weight for one component potentially reduces the design-to-unit-production cost. Successful incorporation of the GKN roadwheel is expected to result in a weight savings of 607 pounds per vehicle and an estimated developmental cost avoidance of \$600,000.

**Antenna Mast for Tactical Mobile Communications — Finland, France, Italy, Sweden, United Kingdom – Army**

This project evaluated communications antenna mast systems that can be integrated into current and future tactical communications systems for the Digitized Army. Mast Systems of Finland, LERC S.A. of France, Larimart of Italy, Wibe of Sweden, and C&S Antenna of the United Kingdom are manufacturers of the candidates. The Army requires masts of several heights with the capability to mount multiple antennas that can be individually aimed. The Program Manager, Warfighter Information Network-Terrestrial (PM WIN-T), at Fort Monmouth, New Jersey, conducted the test program. Test article contracts were awarded in FY 2001, and testing of the Finnish, French, Swedish, and British candidates was successfully completed at the end of FY 2002 – the Italian company withdrew from the project after Phase I due to scheduling conflicts. This effort is intended to address many applications and antenna requirements for the Army, and procurement decisions for specific Army platforms will be made in late FY 2003. This project will result in improved reliability of mast hardware components, increased capabilities, improved safety and operational performance, and decreased life-cycle-costs.





**Chemical Protective Gloves – Canada – USSOCOM**

This project evaluated emerging chemical-biological protective glove technologies developed by two Canadian companies, Acton International and Albert Cloutier, to meet an immediate Special Operations Forces (SOF) requirement to replace the standard butyl chemical protective gloves now in use. The current 14- or 25- mil thickness butyl gloves do not offer the dexterity, tactility, or durability required by SOF operators; and the 7-mil gloves require over-gloves for adequate durability. The Army's Soldier Biological Chemical Command, Natick, Massachusetts, conducted the test program. Originally included in the FCT program were candidates from Austria, France, Germany, Canada and the United Kingdom. The glove system from Albert Cloutier of Canada, comprised of an impermeable glove liner with a Canadian Flyer's Over-Glove, met all key requirements and was operationally preferred by SOF users. A total of 20,000 gloves from Cloutier, valued at \$1.2 million, will be procured for Special Operations Forces each year during FY 2003-2005. This successful project resulted in an estimated development cost avoidance of \$7 million and operational and life-cycle cost savings of \$500,000.

**Combat Vehicle Troop Seat – Sweden – U.S. Marine Corps**

This FCT project evaluated a Troop Compartment Seat manufactured by Haaglunds for the Norwegian Armed Forces CV-9030 vehicle, for potential application to the Marine Corps' Advanced Amphibious Assault Vehicle (AAAV). The test program, which included weight and blast shock measurements, was conducted at the Navy Surface Warfare Center, Carderock Division, Maryland; Aberdeen Proving Ground, Maryland; and at the Marine Corps' AAAV Technology Center, Woodbridge, Virginia. Although the Haaglunds troop seat performed well in static and mine blasting tests, it did not satisfy the USMC user jury vehicle integration requirements for number of personnel the vehicle must carry and was not selected for procurement.

**Expeditionary Airfield Light-Duty Mat System – France – Navy**

This project evaluated a woven polyester mat (Mobi-Mat) manufactured by Deschamps. This would replace the aluminum-surfaced mat used for expeditionary missions that require a stable airfield surface for Vertical Take-Off and Landing (VTOL) operations of rotary-wing and tilt-rotor aircraft. Mobi-Mat is currently being utilized by British Royal Air Forces, Italian Army and Navy units, and the Australian Army, as well as by commercial airports in Geneva, Switzerland, and Orly Airport in Paris, France. The Naval Air Systems Command Aircraft Launch and Recovery Systems Program Office conducted the test program at the Naval Air Warfare Center, Lakehurst, New Jersey, and with Marine Corps Air units deployed in Operations Enduring Freedom and Iraqi Freedom. Testing was completed in mid-FY 2002 with excellent results. Initially, 18 Mobi-Mat "rolls" worth \$200,000 were procured, and a production order for an additional 70 "rolls" worth \$500,000 was made to meet the urgent Marine Corps requirement. Introduction of Mobi-Mat in the Marine Corps' inventory will provide an increase in mission readiness, permit faster deployment, and reduce logistics support costs over current equipment. This project resulted in an estimated development cost avoidance of \$2 million and projected production cost savings of \$3 million.



### **High Mobility Engineer Excavator – Australia, Germany – Army**

This project evaluated candidate high mobility excavators developed by Australian Defense Industries of Australia (upper photo) and Daimler-Chrysler of Germany (lower photo) for their characteristics that support the Army Chief-of-Staff's Army Transformation Initiative: C-130 deployability, all-wheel drive, diesel engine, and multiple attachment acceptability for a backhoe and bucket loader. The Army's Tank Automotive and Armaments Command, Warren, Michigan, conducted the test program at Aberdeen Proving Ground, Maryland. Test article contracts were awarded, and testing began in FY 2001. The test program was completed in FY 2002, with the Australian candidate, teamed with Oshkosh Truck Corporation in Wisconsin, selected for procurement. An initial



production contract for 40 excavators worth \$11.2 million was awarded, with first deliveries to the Army planned for early FY 2003. There is an option to procure 22 more vehicles, if required. In addition to improving operational capabilities for the Army's more deployable forces and interoperability with coalition forces, this successful project resulted in an estimated development cost avoidance of \$5 million and accelerated fielding time of 5 years.

### **High Performance Hydraulic Pump for Advanced Amphibious Assault Vehicle – Marine Corps**

This project evaluated the performance of the KVA55 high performance hydraulic pump developed by Bosch Rexroth AG for use on the AAV. A test article contract was awarded in FY 2000 and the test program began at the Marine Corps AAV Technology Center, Woodbridge, Virginia. System functional and endurance tests by the AAV prime contractor, General Dynamics Amphibious Systems, completed at the end of FY 2002, revealed that the pump did not meet the AAV's performance requirements. The project is being closed out.



### **Improved Battery Cells – Canada, Taiwan – Army**



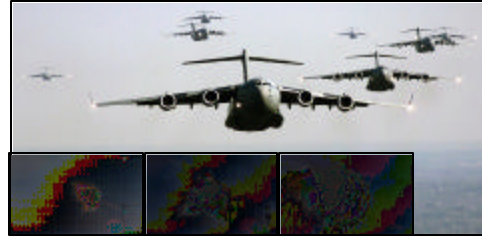
This project evaluated advanced battery cells and batteries manufactured by NexCell of Taiwan (pictured on the left) and Moli Energy of Canada (right) that promise significant improvements in performance over batteries currently used by the Joint Services. Test article contracts were awarded in FY 1999. The Army's Communications and Electronics Command completed the test program at Fort Monmouth, New Jersey, in late FY 2002. Although both batteries powered the SINCGARS tactical radios well, the Canadian cell design outperformed the NexCell candidate. Following the FCT success, Moli Energy improved their Lithium-Ion cells

significantly. The Army will procure 20,000-30,000 of the latest design Moli Energy cells valued at \$15 million, beginning in early FY 2003, with an additional 100,000 units over the next 5 years. This project will result in an estimated development program cost avoidance of \$2 million, savings in procurement costs of \$2.5 million per year, and operations and support life-cycle cost savings of \$5 million.

**Infrared Flare for the C-17 Aircraft – Germany – Air Force**

This FCT project initially assessed the effectiveness of Buck Neue Technologie's RP-12 infrared flare to protect C-17 aircraft when combined with countermeasures being examined under the Air Forces' Advanced Strategic and Tactical Infrared Expendables Program. Initial testing was completed in FY 1997 and operational testing was conducted in early FY 1998.

The RP-12 flare combination showed no advantage over the current flare mix and was not procured. However, radiometric tests of the German operational flare demonstrated potential. In FY 2000, the OSD FCT Office requested the Air Force Air Mobility Command (AMC) re-validate the need and provided FCT funds to complete the examination of the latest operational flare, the DM-69A2. The Naval Research Laboratory, Chesapeake Bay Division, Maryland, was technical lead for laboratory testing and analysis of C-17 flare drops conducted by the 46<sup>th</sup> Test Wing, Eglin AFB, Florida, under the direction of the 33<sup>rd</sup> Flight Test Squadron, Fort Dix, New Jersey. Testing is complete and the flare met the safety requirements of the Non-Nuclear Safety Review Board. Air Mobility Command decided to pursue two alternative flares that are under development and show promise to meet the same need. AMC will reconsider procurement only if the new flare combination fails performance or qualification testing. The justification was to have only two rather than three new flares in the Air Force inventory.

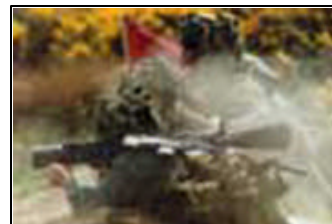
**Joint Protective Aircrew Ensemble – Germany – Navy**

This project evaluated foreign chemical-biological (CB) aircrew ensembles to determine whether they meet U.S. requirements. While the Joint Services Lightweight Integrated Suit Technology (JSLIST) program addresses new technologies for ground troops in chemical-biological protection, CB garments for the aviation community have not been updated for over a decade. Test items were received in early FY 2001 and the evaluation was conducted by the Joint Service Test Team at the Naval Air Warfare Center, Patuxent River, Maryland. The two-phased rolling down-select was completed in March 2002. The team of Blucher GmbH and Theodolf Fritsche GmbH, both presented by Creative Apparel Associates of Belmont, Maine, were contracted by the Navy to produce 1,200 garments valued at \$600,000 for System Development and Demonstration, and Low Rate Initial Production for operational testing. Full Rate Production is valued at approximately \$75 million. This project resulted in an estimated development cost avoidance of \$8.23 million.



**Joint Ranger Anti-armor, Anti-personnel Weapon System Ammunition Upgrade, Phase II – Sweden– USSOCOM**

This project evaluated three types of insensitive munitions: dual purpose and high explosive ammunition, plus a close combat anti-personnel round for type classification and fielding, to meet U.S. fuze safety and insensitive munitions (IM) requirements. All rounds are developed by Saab Bofors Dynamics for the 84mm Carl Gustaf Recoilless Rifle, which was evaluated successfully under the FCT Program and fielded initially with the Army's 75<sup>th</sup> Ranger Regiment in 1990. The test program, conducted at the vendor's facility in Sweden, the Army's Aberdeen Proving Ground, Maryland, and the Naval Surface Warfare Centers at Crane, Indiana, and Indian Head, Maryland, has been successfully completed. It involved type classification and verification that rounds met U.S. fuze safety and insensitive munitions requirements. A Milestone C production approval decision for the High Explosive Dual Purpose (HEDP) 502 IM round and the anti-personnel Area Deterrent Munition (ADM) 401 round was completed in July 2002. A Milestone C production decision for the High Explosive 441D RS (reduced sensitivity) round will be conducted in March 2003. This FCT project resulted in an estimated development cost avoidance of \$30 million and unit production cost savings of approximately \$300-\$500 per round procured.

**Man-Portable Decontamination Equipment/Large Aircraft Interior Decontamination – Germany – Air Force (joint with USSOCOM)**

This project evaluated two systems manufactured by Odenwald-Werke Rittersback (OWR) to meet military requirements for decontamination of aircraft and other sensitive equipment from chemical and biological agents, without affecting the sensitive components. The Human Systems Wing at Brooks AFB, Texas, managed the initial test phase for the Air Force. Efficacy and material compatibility tests in FY 2001 were carried out at the facilities of Defence Research and Development Canada - Suffield, under the direction of the Air Force Operational Test and Evaluation Command. These tests were promising with the exception of decontamination of mustard agent (HD), for which possible corrective measures were identified and additional tests required. Follow-on tests for the Air Force application were conducted by Battelle Process Engineering in Columbus, Ohio. The Air Force proved the GD-5 decontamination aerosol was effective against hoof-and-mouth disease during the epidemic in Europe, but corrosion tests were inconclusive. The Air Force determined the systems were not suitable for aircraft interior decontamination and will not procure them. Leveraging the efforts of the Air Force, in particular the complex aerosol tests at Battelle, USSOCOM conducted a military utility assessment of the German decontamination systems to rapidly field a man-portable, non-aqueous decontamination capability. The results of this assessment were positive and led to a decision to meet an urgent operational requirement by procuring both the German OWR Deco-Fogger (below photo) and Cobra (above photo) decontamination systems for use by Special Operations Forces. This project resulted in an estimated development program cost avoidance of \$6.6 million and production cost savings of \$1 million.



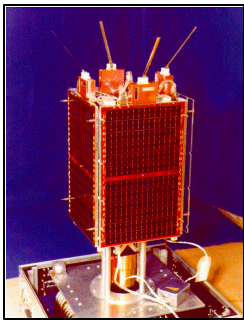


**Less-Sensitive RDX – France – Army (joint with Navy and Air Force)**

This project evaluated a new less-sensitive RDX high-energetic material used in explosives, propellants, and initiation activators for insensitivity requirements for cast explosives for 155mm artillery projectiles and other munitions and rocket applications. Manufactured by Société Nationale pour Poudres et Explosifs (SNPE) of France, this technology may benefit all future U.S. munitions procurements. A test materials contract was awarded in late FY 2000. The test program included the reprocessing by SNPE of RDX provided by the Army's Holston Ammunition Plant in Tennessee. Army, Navy, and Air Force test activities participated in the extensive evaluation of the explosives formulation, comparing 155mm high-explosive projectiles loaded with new cast explosives formulated with three types of RDX: the standard Holston RDX, the Holston RDX re-processed by SNPE, and the original SNPE material. Testing was completed in late FY 2002. Results demonstrated that the SNPE product improves the insensitivity characteristics of artillery projectiles and gun and rocket propellants. The Army is verifying the long-term stability of the material and, if satisfactory, plans to negotiate a licensing agreement with the French manufacturer.



**Micro-Satellite for Space Experiments – United Kingdom – Air Force**



This project was a technical assessment of whether a micro-satellite spacecraft bus developed by Surrey Satellite Technology, Ltd. could meet Air Force space flight requirements for low-cost, quick-response space experiment missions. The test article contract was awarded in FY 1997, initiating the spacecraft design, build, and test phase. Ground testing was completed satisfactorily in late FY 1999. U.S. Space Launch policies precluded the planned launch of the unit on a foreign vehicle, and the satellite was placed in long-term storage at the contractor's facility awaiting a viable launch opportunity. "PICOsat" was finally launched aboard NASA's Kodiak Star mission (Athena-1 launch vehicle) from the Kodiak launch facility in Alaska late in FY 2001 and is operating nominally through the Air Force Academy control station in Colorado Springs, Colorado. The PICOsat spacecraft fully met the goals of the Microsatellite for Space Experiments program by providing cost-effective spaceflight for four DoD experiments. The project also established the usefulness of standard microsatellite-class buses for the Space Test Program (STP) and the DoD. As a result, Surrey Satellite Technology, Ltd. spacecraft will be considered for future STP missions.

**Muzzle Brakes/Suppressors for M4 Carbine – Switzerland – 2001**

This project evaluated candidate muzzle brakes/suppressors manufactured by Brugger and Thomet Feinmechanik and several U.S. candidates. U.S. Special Operations Command mission requires a quick-attach suppressor/muzzle brake for the M-4 Carbine that will decrease flash and sound, thereby reducing the probability of detection of the shooter's location by enemy forces. The test program was completed in FY 2002 at the Naval Surface Warfare Center, Crane, Indiana. The Swiss candidate suppressor did not meet threshold requirements and will not be procured. The test report is under preparation.



### **Patrol Coastal Decoy System – United Kingdom – USSOCOM**

This project evaluated the Super Barricade intelligent decoy system developed by ML Aviation for installation and integration on Patrol Coastal ships (PC-14) within the ship's production schedule. The current anti-missile chaff system installed on special operations patrol coastal ships presents significant safety and operational deficiencies. As part of this project, and because of prior Navy and FCT Program experience in 1989 with the UK system to meet a requirement for PHM hydrofoils, the Super Barricade system was incorporated into the design and construction of PC-14, assigned to the U.S. Special Operations Command for operational control. The test article contract was awarded in late FY 1998. The overall project schedule suffered funding setbacks when additional testing requirements became necessary; however, the system was installed, integrated with the shipboard sensors, and completed a formal Operational Assessment in November 2001, during which it was discovered that some of the U.S. shipboard sensors did not adequately transfer data to the Super Barricade for semi-automatic and full-automatic modes. Post-September 11<sup>th</sup> world events dictated a transfer of the PCs to the U.S. Coast Guard for the purpose of Homeland Defense. Further, the decision was made to transfer the PCs from USSOCOM to the Navy effective October 2002. Patrol Coastal-14 has been transferred with the UK system installed and fully operational in manual mode.



### **Personal Temperature Regulation System – Germany – USSOCOM**



This project evaluated the effectiveness of personal temperature regulation garments and liners for Special Forces warfighters performing a variety of missions around the world. The Navy Clothing and Textile Research Facility at Natick, Massachusetts, conducted the test program. Candidate garments from Texplor of Germany were subjected to a variety of laboratory tests and operational assessments. Representative users assessed the products at Ft. Bragg, North Carolina, and selected sites in California. The testing revealed that the garments provided some ability to regulate the wearer's body temperature; however, the garments were not effective in all types of operational scenarios and, therefore, did not meet the user's requirements.

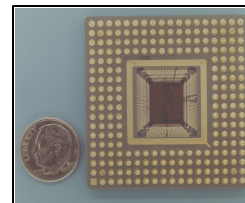
### **Retractable Arresting Cable System – France – Air Force.**

This project evaluated a system developed by Aérazur for use by Air National Guard (ANG) air bases that share the runway with commercial airports. The system locks the arresting cable in the up position when needed for fighter aircraft and retracts the cable when not required for commercial and military cargo aircraft. This retraction reduces wear of the cable, since every aircraft using the runway will not have to trample it. The system is currently used in the Czech Republic, France, Spain, Saudi Arabia, and Switzerland. The Air Armaments Center at Eglin AFB, Florida, conducted the test program. The Aérazur system was delivered in FY 2001, installed at the Iowa ANG base contiguous with the Des Moines International Airport, and tested using ANG F-16 aircraft configured with different weights based on fuel load. The test program was completed in December 2001. The French system demonstrated superior performance and reliability and remains permanently installed for operational use. Additional systems will be procured in mid-FY2003. This project resulted in an estimated development program cost avoidance of \$10M, accelerated fielding of 4 years, and is expected to save \$3 million in production costs.



### **Space-Qualified Digital Signal Processor – Austria, France – Air Force**

This project evaluated digital signal processors and circuit boards manufactured by Atmel Wireless and Microcontrollers (formerly Temic Semiconductors) of France and Austrian Aerospace of Austria as second sources for Spaced Based Infrared Systems, MILSATCOM, and other military space systems. The Air Force Research Laboratory, Space Environmental Effects, Space Electronics, and Satellite Protection Technologies Program Office at Kirtland AFB, New Mexico, conducted the test program. Test article contract awards to both companies were completed in early FY 2001. Testing was conducted at Hill AFB, Utah, and Kirtland AFB, New Mexico. The FCT test program has been completed successfully and procurement is planned. By conducting this FCT project, it is estimated that development cost avoidance will be \$50 million, or about the cost to develop a new space prototype digital signal processor. Procurement cost savings are expected to be about \$3.9 million, and operations and support life-cycle cost savings are estimated at \$100 million.



### **Stealth Screen System – France – Navy**



This project evaluated the Stealth Screen System developed by ACH-Engineering (formerly Société Nouvelle des Ateliers et Chantiers du Havre) of France. This wire mesh screen conceals the Remote Mine Hunting System aboard Arleigh Burke class Aegis Destroyers. The system is designed to cover the opening for the minehunting system with a flat surface that has radar properties approximating those of the ship deckhouse. The test article contract was awarded in fourth quarter FY 1999 and the prototype unit was received in second quarter FY 2001. Reliability testing began soon thereafter at Ingalls Shipbuilding, Pascagoula, Mississippi, and was completed in third quarter FY 2001. The Naval Research Laboratory, Chesapeake Bay Division, Maryland, and Naval Surface Warfare Center conducted radar cross-section testing on screen samples. The test program was completed successfully in third quarter FY 2002. Ingalls Shipbuilding has ordered four production units valued at \$1.4 million, resulting in an estimated development cost avoidance of \$7-\$8 million and estimated production cost savings of \$60,000 per unit.

### **Supersonic Target Missile – Russian Federation – Navy**

This project was approved for the FY 2000 FCT program to evaluate Russian Federation SS-N-22 missiles (NATO designation Sunburn) for use as aerial targets for training. The Navy has a requirement to validate, test, and improve defensive systems against long range, all-weather, supersonic, sea-skimming missiles, such as the Russian item. In FY 2000, and again in FY 2001 and FY 2002, the project was placed “on hold” due to extended delays and continuing unresolved difficulties in arranging for test articles between Boeing Aircraft Company, St. Louis Division, and the Russian State Corporation Rosvoorouzhenie (now Rosboronexport). The project was officially terminated in late FY 2002 without being funded.



### Unattended Ground Imager – Israel– Air Force

This project evaluated a man-portable detection and assessment system, developed by Seraphim Optronika, Ltd., used in deployed security perimeter applications or as an unattended ground sensor for combat information gathering. The Air Force has a requirement for covert, long-range, standoff perimeter approach surveillance for Security Forces providing ground defense of air bases or deployed forces. Inclement weather severely restricts the effective range of current imagers. The Air Force Electronic Systems Command, Hanscom AFB, Massachusetts, conducted the test program with the 46<sup>th</sup> Test Squadron at Eglin, AFB, Florida. The test article contract was awarded in FY 2001. Performance was determined with sensors positioned on asphalt and in remote grassy areas, in isolated rugged terrain, and in other configurations. The Air Force determined the Israeli system did not meet the technical requirement, and it will not be procured.



### VLF/LF Composite Bushing Replacement – Switzerland – Navy

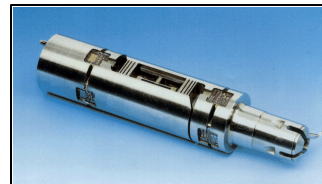


This project successfully evaluated the use of advanced composite bushings, developed by Tyco Electronics of Switzerland (formerly Cellpack Advanced Technologies), for use at the Navy's shore-based high power VLF/LF (Very Low Frequency/Low Frequency) transmitting stations that provide coverage to the U.S. strategic submarine broadcast community. The objective was to replace the porcelain bushings protecting the juncture where the high voltage-high current power line from the antenna tuning elements in the helix house attaches to the outdoor antenna structure. Many of the bushings are near or past their operational service period, and replacements are no longer in production. The Space and Naval Warfare Systems Center, San Diego,

California, conducted the test program at the Dixon High Voltage Test Facility, near Sacramento, California. The Navy plans to procure the Tyco Electronics composite bushings for up to eight VLF/LF sites beginning in FY 2004. Use of the composite bushings will save from one-third to one-half the cost of a porcelain bushing (including installation).

### Wind Tunnel Internal Force Balance – United Kingdom, France, Germany, Netherlands – Air Force

This project evaluated internal force balances manufactured by Aerotech of the United Kingdom, ONERA of France, Darmstadt University of Technology of Germany, and the National Aerospace Laboratory of the Netherlands. The wind tunnel force balances in use at the Air Force's Propulsion Wind Tunnel Facility at Arnold Engineering Development Center (AEDC) were built using technology developed in the 1950s and 1960s. As a result, most of the balances incorporate outdated technology and many are wearing out. Test article contracts were awarded in FY 2000. The foreign-designed balances were evaluated alongside balances manufactured by AEDC. The test program was completed in August 2002. The Air Force determined the AEDC-manufactured balances provided best value with overall equal or better technical performance. Through options in the project contracts, AEDC intends to consult further with the foreign vendors in the areas of temperature sensitivity and creep effects; however, no Air Force hardware procurements are imminent.





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**CONTINUING PROJECTS AND NEW FY 2003 PROJECTS**

Twenty-four projects begun in previous fiscal years have not completed testing and remain open. Fifteen new projects were initiated in FY 2002 and are continuing. Twenty-six new projects were selected for funding in the FY 2003 FCT Program. Table 4 lists these projects by sponsoring Service/U.S. Special Operations Command, with the start year indicated.

**Table 4. CONTINUING PROJECTS AND NEW FY 2003 PROJECTS**

<b>Sponsor</b>	<b>Project</b>
<b>Army (15)</b>	40mm Dud Reducing M430A1E1 HEDP Cartridge – 2002 105mm Preformed Fragments – 2003 155mm Ammunition – 2003 Ballistic Armor for Helicopters – 2003 Bradley Fighting Vehicle Long-Life Roadwheels – 2001 Driver's Vision Enhancer – 2001 Fuel Cells for Dismounted Soldier Systems (joint with USSOCOM) – 2003 Laser Obstacle Detection System (joint with USSOCOM) – 2002 Lightweight Chemical Agent Detector – 2000 Optically Improved Standard Advanced Dewar Assembly Type II – 2001 Prophet Ground – 2001 Self-Destruct Fuze for Multiple Launch Rocket System (MLRS) – 2002 Silverized Kevlar – 2002 (out-of-cycle) Small Bundle Resupply System – 2003 Standard Advanced Dewar Assembly (Type I) – 1997
<b>Navy (14)</b>	Corona Monitoring System – 2003 Digital Flight Control System for EA-6B – 2002 High Frequency Adaptive Antenna Receive System Replacement – 2002 High-Temperature Protective Coating for Gas Turbine Engines – 2003 Improved Specific Emitter Identification System – 2003 Infrared (IR) Decoy – 2002 (out-of-cycle) Multi-Bandwidth Submarine Antenna – 2001 Replacement Structures for Aircraft – 2003 Resilient Abrasive-Resistant Skirt for LCAC (Landing Craft-Air Cushion) – 2003 Shipboard Anti-Jam GPS Antenna – 2003 Star Tracker (joint with Air Force) – 2000 Submarine Torpedo Room Berthing Pod – 2001 Tactical Geographic Information System (Maria) – 2001 Underwater Communications & Tracking System for Submarines – 2003
<b>Marine Corps (11)</b>	Assault Breacher Vehicle Mine Plow, Lane Marking System – 2002 (out-of-cycle) Communications Distribution System – 2002 Deployable Instrumentation for MAGTF Training – 2003 Eye-safe Laser Rangefinder for M1A1 BattleTank – 2003 Floating Smoke Pot System – 2001 High Rate-of-Fire .50 Caliber Machine Gun (joint with Air Force) – 2003 Lightweight Aluminum Track for AAV – 1999 Lightweight Diesel-Driven Auxiliary Power Unit – 2000 NBC Multipurpose Protective Sock – 2002 Skin and Open Wound Decontamination – 2001 Special Effects Small Arms Marking System – 2003

<b>Air Force(9)</b>	Airborne Video Recorder/Replay System – 2001 Eagle Vision Sensor Upgrades – 2002 (out-of-cycle) Fiber-Optic Security Fence – 2002 (out-of-cycle) Man-Portable Intrusion Detection System – 2003 Missile Reserve Battery Replacement – 2003 Plastic Practice Bombs – 1999 Rayon for Heatshield and Motor Nozzles – 2003 Self-Regulating Anti-g Ensemble – 2002 Wideband Klystron for E-3 AWACS – 2000
<b>USSOCOM(16)</b>	7.62mm Lightweight Machine . Gun – 2002 40mm Enhanced Grenade Launcher for M4 Carbine – 2003 Advanced Demolition Weapons – 2001 Advanced Lightweight Grenade Launcher Ammunition – 2000 Body Armor Flotation Vest – 2003 Body-Worn Radar Receivers – 2003 Global Cellular Phone System Optimization – 2003 Gunfire Detection System – 2000 MAAWS Infrared Illumination Round – 2001 Man-Portable Multi-Sensor System – 2001 Man-Portable SATCOM (Satellite Communications) System – 2003 MC130-H Aerial Refueling System Pod – 2000 Parachute Leaflet Delivery System – 2000 Stand-Alone Cooling Suit – 2002 Ultralight Aero Diesel Engine – 2003 Wireless LAN Monitoring System – 2003

**ARMY****40mm Dud-Reducing M430A1E1 HEDP Cartridge – Singapore , Switzerland – 2002**

This project is evaluating dud-reducing ammunition fuzes developed by Chartered Ammunition Industries Pte, Ltd. of the Republic of Singapore and Dixi Microtechniques SA of Switzerland for effectiveness, safety, and feasibility when integrated into the current 40mm M430A1 High Explosive Dual Purpose Cartridge. The current fuze experiences a relatively high dud rate when fired against soft targets, such as sand or snow. This dud rate creates a dangerous unexploded ordnance situation for friendly forces that must subsequently maneuver over the same terrain, as well as for innocent civilians. The Product Manager for Small Arms, Picatinny Arsenal, New Jersey, will oversee the test program at Aberdeen Proving Ground, Maryland, by the Army Test and Evaluation Command. Test planning is in progress. Test article contract awards are expected in late FY 2003.

**105mm Preformed Fragments – Republic of South Africa – 2003**

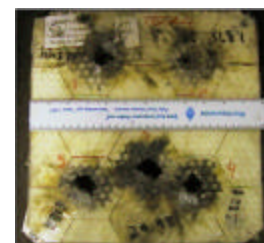
This project will evaluate both the potential increased lethality and range of the conventional 105mm Field Artillery ammunition, developed by Denel-Naschem, over the current U.S. 105mm ammunition. If successful, the project will greatly enhance the lethality of U.S. Army light forces. The Army Product Manager for Combat Ammunition Systems (PM-CAS) will conduct the test program at Yuma Proving Ground, Arizona; Aberdeen Proving Ground, Maryland; Dugway Proving Ground, Utah; White Sands Missile Range, New Mexico; and at Picatinny Arsenal, New Jersey.

**155mm Ammunition – Republic of South Africa – 2003**

This project will evaluate the potential increased range of the family of 155mm Field Artillery projectiles, developed by Denel-Naschem, over current U.S. 155mm ammunition. If successful, the project will greatly increase the fire support provided to U.S. Army ground forces. The Army Product Manager for Combat Ammunition Systems (PEO-AMMO/PM-CAS) will conduct the test program at Yuma Proving Ground, Arizona; Aberdeen Proving Ground, Maryland; Dugway Proving Ground, Utah; White Sands Missile Range, New Mexico; and at Picatinny Arsenal, New Jersey.

**Ballistic Armor for Helicopters – Australia, Canada, United Kingdom – 2003**

This project will evaluate lightweight ballistic armor, developed for law enforcement use by Craig International Ballistics of Australia, ACERAM Technologies of Canada, and Meggitt of the United Kingdom. If successful, the project will not only provide increased ballistic protection over the current armor, but also greatly reduce the overall weight of aircraft, thereby improving operational performance. The Army PEO for Aviation, Redstone Arsenal, Alabama, will conduct the test program at the Army Research Laboratory, Aberdeen, Maryland.



**Bradley Fighting Vehicle Long-Life Roadwheels – Canada, Republic of South Africa – 2001**

This project is evaluating polyurethane coatings for combat vehicle roadwheels, developed by Elastochem Specialty Chemicals of Canada, Allthane Technologies of the Republic of South Africa, and Winfield Industries of Buffalo, New York, to upgrade the Bradley Fighting Vehicle and extend its service life for a three-fold cost savings over the current rubber roadwheels (photo comparison at right). Through adaptations over the years, the Bradley Fighting Vehicle has been upgraded to stay ahead of changing missions, capabilities, and technologies. As a result, more weight has been added to the vehicle system, and more stress is exerted on the roadwheels. The Army's Tank Automotive and Armaments Command, Warren, Michigan is conducting the test program. Phase II testing will begin in early FY 2003 at both Yuma Proving Ground, Arizona, and the Army's Cold Regions Test Center at Fort Greeley, Alaska.

**Driver's Vision Enhancer – Canada – 2001**

This project is evaluating a thermal imaging system manufactured by Thales (formerly Thomson-CSF) for integration into the Army's Driver's Vision Enhancer Program. Vision enhancer devices are critical during combat operations, allowing operators of wheeled and track vehicles to see in dark and obscured conditions. The Army's Night Vision and Electronic Sensors Directorate at Fort Belvoir, Virginia, is conducting the test program. A test article contract was awarded in FY 2001. Qualification testing began in November 2002 and is scheduled for completion in March 2003 when a procurement decision will be made.

**Fuel Cells for Dismounted Soldier Systems – Canada, Germany, United Kingdom (joint with U.S. Special Operations Command) – 2003**

This project will evaluate electrochemical fuel cells developed by Ballard Power Systems and Hydrogenics, both of Canada, NoVars and Smart Fuel Cells, both of Germany, Intelligent Energy, Inc. of the United Kingdom, and candidates from DCH Technology, Ball Aerospace, Inc., and Lyntech of the U.S., with regard to Army requirements for longer lasting, lighter weight portable power sources. Improved power sources are critical for all components of the Future Force. The Army Communications and Electronics Command, Fort Monmouth, New Jersey, the Army PM for Mobile Electric Power, and USSOCOM will conduct the test program at the Fuel Cell Test Laboratory, Fort Belvoir, Virginia, and other designated laboratories.



**Laser Obstacle Detection System – Germany (joint with U.S. Special Operations Command) – 2002**

The European Aeronautic Defence and Space (EADS) Company-Dornier Group manufactures a Helicopter Laser Radar (Hellas) item that may improve aircrew avoidance of hazardous obstacles by providing detection, processing, and warning of imminent aircraft safety hazards. The Hellas system is in use by the German Border Patrol. This project is evaluating the characteristics of the Hellas system and its ability to satisfy tactical operational requirements for obstacle avoidance. It will assess the supportability, suitability and feasibility of integrating the system onto Army/U.S. Special Operation Forces aircraft platforms and includes hardware qualification. The Army Communications and Electronics Command, Night Vision & Electronic Sensors Directorate at Fort Belvoir, Virginia, is leading a joint Army/U.S. Special Operations Command program team in this effort. The HELLAS system has been integrated into a UH-60 “Blackhawk” helicopter test bed. A three-month flight test period will begin in February 2003 at Fort Eustis, Virginia. Upon completion, primary cognizance over the project will transition to the U.S. Special Operations Command.

**Lightweight Chemical Agent Detector — Finland, United Kingdom (joint with U.S. Special Operations Command) – 2001**

This project is evaluating two lightweight chemical agent detectors, the LCD-3 manufactured by Smith Detection of the United Kingdom (formerly Graseby Dynamics) (left), and the ChemPro 100 manufactured by Environics Oy of Finland (right), to determine whether they meet or exceed the requirement for personal warning and protection under the specifications for the Joint Chemical Agent Detector (JCAD).



The test article contract was awarded to Graseby Dynamics in FY 2000 and to Environics Oy in FY 2001. Testing is underway at the Army’s Chemical/Biological Center in Edgewood, Maryland.

**Optically Improved Standard Advanced Dewar Assembly Type II — France – 2001**

This project is evaluating SOFRADIR’s Optically Improved Standard Advanced Dewar Assembly-Type II for integration into the Army’s Horizontal Technology Integration Program second-generation FLIRs. The SOFRADIR assembly incorporates the latest optical improvements and represents state-of-the-art FLIR detector/dewar performance. The Program Manager, FLIR Systems, is conducting the test program at the Army’s Night Vision and Electronic Sensors Directorate, Fort Belvoir, Virginia. A test article contract was awarded in FY 2001. Due to the excellent results being achieved in the project to date, the Army made an initial production buy from SOFRADIR of 101 units valued at \$3.8 million in late FY 2002. The test program is continuing.



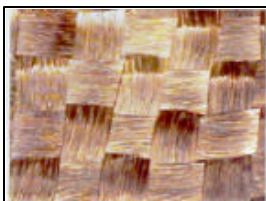


**Prophet Ground – Canada, Israel, United Kingdom – Army – 2001**

This project is evaluating the capabilities of signals intelligence subsystems developed by the Defense Research Establishment-Ottawa, Canada, Tadiran of Israel, and Thales and QinetiQ, both of the United Kingdom, to detect the presence of conventional and agile signals. The Army's Program Executive Officer for Intelligence, Electronic Warfare, and Sensors, Fort Monmouth, New Jersey, is conducting the test program. Test article contracts were awarded in third quarter FY 2001. FCT testing of the candidate subsystems to meet Army requirements is continuing with positive results to date at Fort Monmouth and Fort Huachuca, Arizona.

**Self-Destruct Fuze for Multiple Launch Rocket System – Israel – 2002**

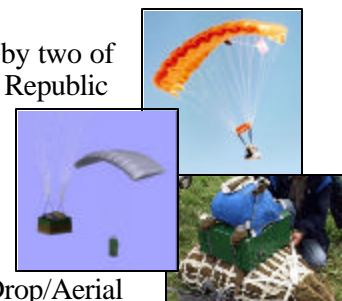
This project is evaluating the performance, safety, and feasibility of a self-destruct fuze developed by Israeli Military Industries of Israel. Variants of the fuze are fielded with Israeli armed forces. The fuze will be integrated into the submunitions of the MLRS system for testing to ensure that the rocket submunitions have a dud rate of less than 1% (a key performance parameter). In addition to the Army's current requirement, the Air Force and Navy have expressed interest in self-destruct technology for other submunitions. The Army Missile Command at Redstone Arsenal, Alabama, is conducting the test program. Phase I live-fire testing was conducted at White Sands Missile Range, New Mexico, by the Army Test and Evaluation Command, and a German/French candidate fuze was dropped from the project. Phase II tests are planned for later in FY 2003.

**Silverized Kevlar – Canada – 2002**

This project is evaluating Silverized Kevlar developed by Silverleaf Materials, Ltd. for use on the Army's RAH-66 Comanche helicopter. This material could enhance the performance characteristics of the structure with regard to conductive ground plane, electro-magnetic interference shielding, and static discharge and achieve overall weight savings by eliminating layers of parasitic conductive materials. The test program is being conducted by the Army's Aviation Applied Technology Directorate, Fort Eustis, Virginia, at the vendor's facilities in Canada, and at the Sikorsky Aircraft Corporation plant, Stratford, Connecticut.

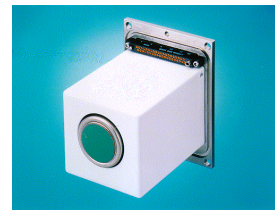
**Small Bundle Resupply System – Canada, Republic of Korea, Netherlands – 2003**

This project will evaluate compact guidance and control units developed by two of the following three competing vendors: MMist of Canada; Koable of the Republic of Korea; and Fokker Space of the Netherlands, as alternatives to the Parafoil Aerial Delivery System – Extra Light. If successful, the project would provide extremely precise high-altitude delivery of small bundles and airborne troops for missions such as re-supply for military operations in urban terrain, delivery of small robots and sensors, counter-terror operations, and humanitarian support missions. The Air Drop/Aerial Delivery Directorate of the Army's Natick Soldier Systems Center, Natick, Massachusetts, will conduct the test program at Yuma Proving Ground, Arizona.

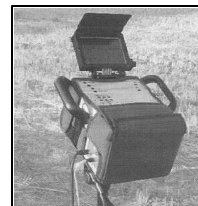


**Standard Advanced Dewar Assembly Type I – France, Germany – 1997**

The Standard Advanced Dewar Assembly-Type I (SADA I) is an integral part of the Army's second-generation infrared imaging system used in fixed and rotary wing aircraft. SADAs allow infrared systems to image, detect, and identify targets at significantly greater distances than first-generation devices. This project is evaluating SADA I modules developed by SOFRADIR of France and AEG Infrarot Modules (AIM) of Germany for use in major Army systems such as Comanche and Apache and Navy/Air Force F-14, F-16, F-18 and F-22 aircraft. The contracts for test articles were awarded in FY 1997 and delivery from both vendors occurred in FY 1998. Testing is continuing in the Comanche Night Sight Test Bed, White Sands Missile Range, and at the Army's Night Vision and Electronic Sensors Directorate, Fort Belvoir, Virginia. Results of this effort continue to be successful for both the Apache and Comanche Helicopter programs. The completion of this FCT project will qualify the selected vendor(s) as supply sources for both aircraft.

**NAVY****Corona Monitoring System – Israel, Republic of South Africa – 2003**

This project will evaluate commercially available daylight corona cameras manufactured by OFIL, Ltd. of Israel, and the Centre for Integrated Sensing Systems (CSIR) of the Republic of South Africa. The cameras are employed for remote viewing and sensing of energized inductors in the transmitting station's helix tuning house, as well as outdoors on the antenna



structure. Providing early detection of damaging corona formation will allow necessary corrective action and prevent unplanned outages in communications to submerged submarines.

**Digital Flight Control System for EA-6B – United Kingdom – 2002**

This project is evaluating a digital flight control system (DFCS) developed by BAE Systems Avionics Ltd. for the Eurofighter, to replace the increasingly obsolete automatic (analog) flight control system in the Navy's EA-6B "Prowler" aircraft. The project follows successful integration of the BAE DFCS into the Navy's F-14 "Tomcat" aircraft. The system holds promise to prevent losses of the DoD's only standoff jammer aircraft caused by spurious readings from the current analog control system. The Program Manager for EA-6B is conducting the test program at the Naval Air Warfare Center, Patuxent River, Maryland.





**High Frequency Adaptive Antenna Receive System Replacement – Canada – 2002**

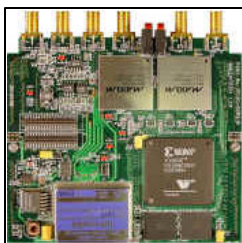
This project is evaluating a high-frequency adaptive antenna system developed by SED Systems to meet a Navy requirement to improve the quality, range, and anti-jam performance of Link-11, ANDVT, and HF radio communications with maritime patrol and surveillance aircraft. The Space and Naval Warfare Systems Center, Charleston, South Carolina, is conducting the test program in coordination with Commander, Naval Patrol and Reconnaissance Forces, Atlantic and Pacific Fleets. Delivery of test articles has been delayed due to

emergent technical contract issues, but the Canadian Embassy is assisting in the effort to resolve them.

**High-Temperature Protective Coating for Gas Turbine Engines – Canada, Russian Federation – 2003**

This project will evaluate the benefit to the operational life of gas-turbine engine hot section components from a protective coating by MDS-PRAD, a joint venture company of Ural Works of Russia (PRAD) and MDS Aerospace of Canada. The protective coating reduces hot-gas corrosion, oxidation and thermal fatigue.

Potential applications include: AV-8B, F/A-18E/F, Joint Strike Fighter, AV-8B, H-53, V-22, SH-60, C-130, E-2, P-3, and naval surface combatants (DDG and DD-X). This effort is a follow-on to the successful coating process certification for gas turbine compressor blades for the M-53 helicopter engines.

**Improved Specific Emitter Identification System – United Kingdom – 2003**

This project will compare NSA-compliant alternatives, developed by QinetiQ of the United Kingdom, to the U.S. specific emitter identification processors for passive identification and fingerprinting of emitters in naval applications. The two NSA-compliant systems currently in Navy use will be included in the tests for comparison. The Navy's Center for Naval Analysis will evaluate the test program at the Naval Research Laboratory, Chesapeake Bay Detachment, and at the China Lake Electronic Combat

Range, Ridgecrest, California. Both maritime and land-based emitters will be used in determining the capabilities of the UK system.

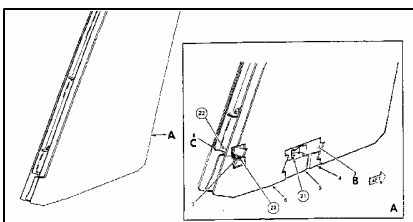
**Infrared (IR) Decoy – Canada – 2002**

This project is evaluating an infrared decoy produced by Magellan Aerospace, the Canadian MJU-5188 liquid pyrophoric decoy, which may have the spectral and spatial characteristics required to provide tactical aircraft with dramatically increased self-protection against IR threat missiles. The MJU-5188 was developed for use on tactical aircraft and has demonstrated excellent effectiveness in Canadian tests against advanced threats. The Naval Surface Warfare Center-Crane Division, Indiana, is conducting the test program at the Naval Air Warfare Center, China Lake, California, with the assistance of VX-31 Test Squadron. Air-to-Air radiometric measurements were taken at NAWC, and material characterization measurements were conducted at the Open Jet Facility at Defence Research and Development, Canada-Valcartier, in late FY 2002.



**Multi-Bandwidth Submarine Antenna – United Kingdom – 2001**

This project is evaluating the ability of a Thales Underwater Systems (formerly Thomson Marconi) antenna to enhance the UHF MILSATCOM performance of the OE-538 Multifunction Communications Mast used on all U.S. submarines. The antenna system provides Identification Friend-or-Foe (IFF) and Global Positioning System (GPS) as well as L-Band for mobile subscriber service communications and wireless networking. The Space and Naval Warfare Systems Command, San Diego, California, is conducting the evaluation at the Naval Undersea Warfare Center, Newport, Rhode Island. Technical tests on the first antenna assembly are in progress, and delivery of the second antenna is expected in early FY 2003.

**Replacement Structures for Aircraft – Belgium, Poland – 2003**

This project will certify and qualify PZL-Swidnik of Lublin, Poland, as an approved source for the manufacture of aluminum honeycomb panels and sub-structures to support in-service, but out-of-production, aircraft. Hexcel of Belgium will provide honeycomb sub-cores to PZL-Swidnik for the project. Replacement of airframe sections is a continuing sustainment issue. This item is a major unit requirement for all aircraft and is a recurring procurement

under military component inventory control. The immediate objective is to provide a cost-effective solution to the warfighter for the replacement of flight control surfaces and sub-structures for the F-14, which is no longer in production and for which parts are no longer available from the original manufacturer. Certification of an alternative source can be used by multiple aircraft. The test program will be conducted by the Navy's F-14 Program Manager, Structures Division, at the Naval Air Warfare Center, Patuxent River, Maryland.

**Resilient Abrasive-Resistant Skirt for LCAC (Landing Craft-Air Cushion) – Italy, Sweden, United Kingdom – 2003**

This project will evaluate candidate materials developed by Reeves S.p.a. of Italy, Trelleborg of Sweden, and Northern Rubber of the United Kingdom to determine if they can provide a 50 percent improvement in the LCAC skirt's resistance to abrasion without a weight or cost penalty. The Amphibious Warfare Programs Office, Naval Sea Systems Command (PMS-377) will conduct the test program at the Naval Surface Warfare Center, Coastal Systems Station Dahlgren Division, Panama City, Florida.



### Shipboard Anti-Jam GPS Antenna – United Kingdom – 2003

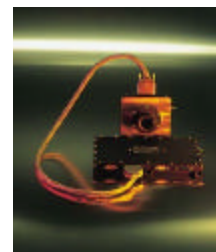


This project will evaluate the GAS-1 Global Positioning System (GPS) anti-jam antenna for Navy surface ship applications. The GAS-1 is produced by Raytheon Systems Limited, Harlow, United Kingdom, and is mounted on large U.S. Air Force aircraft. GPS provides continuous, worldwide, precise navigation to unlimited users in all weather conditions. The encrypted

military code ensures that the U. S. military and its allies have a superior navigation capability; however, the GPS signal from the satellites is of very low power and is vulnerable to jamming. It is expected the British item will satisfy the anti-jam effectiveness of the Navy's Operational Requirement for GPS User Equipment, since the FCT Program recently qualified the smaller GAS-1N anti-jam antenna for tactical aircraft. Particular emphasis will be placed on electromagnetic compatibility in the dense electronic environment of a Navy battle group. The Navy Navigation Systems Program Office, Space and Naval Warfare Systems Command will conduct the test program, coordinated by the Space and Naval Warfare Systems Center, San Diego, California. Testing will begin with mine-countermeasures ships.

### Star Tracker — Denmark (joint with Air Force) – 2000

The Navy and Air Force are evaluating the Terma Elektronik HE 5AS Star Tracker system capabilities to provide absolute, three-axis attitude for spacecraft control, pointing of payloads, and localization of ground observation. The Danish item offers a reliable and affordable attitude determination system for a wide range of DoD satellites. Radiation effects testing of 10 charge couple device (CCD) detectors delivered by Terma was completed in FY 2002 by the Air Force Research Laboratory, Space Vehicle Directorate, Kirtland AFB, New Mexico. Performance and qualification testing of two star trackers, delivered by Terma in FY 2002, is nearing completion at the Naval Center for Space Technology, Naval Research Laboratory, Washington, D.C.



### Submarine Torpedo Room Berthing Pod — Netherlands – 2001

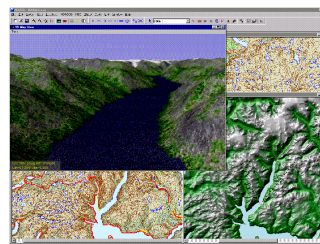


This project is evaluating a berthing pod for submarines, manufactured by Polymarin and in service with the Royal Netherlands Navy. Submarine crewmembers are regularly required to sleep (and often "hot bunk") in temporary torpedo room berths on several classes of submarines, including the newest Seawolf class submarines. The Dutch berthing pod is the size of a MK 48 torpedo and has 3 berths with individual lighting, forced-air ventilation, and storage space when opened. Use of these pods will address a long-standing habitability issue and provide a dramatic quality-of-life improvement for U.S. submariners. Commander, Submarine Forces, U.S. Atlantic Fleet, is conducting the test program with Submarine Development Squadron Twelve, Norfolk, Virginia, and Submarine

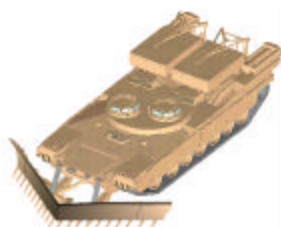
Squadron Four, Groton, Connecticut. A test article contract was awarded to Polymarin in FY 2001. Load testing is being conducted at the Submarine Base in Groton, and the pod will be deployed in early FY 2003 on a 688-class submarine for evaluation.

**Tactical Geographic Information System (Maria) – Norway – 2001**

This project is evaluating a software-based command and control system from Teleplan AS that provides superior battlespace awareness through the rapid display of geographic imagery, and positional information on friendly, neutral, and enemy units. The system provides advanced planning and decision aids such as communication and emitter propagation analysis tools. The project has the added benefit of increasing interoperability with U.S. allies. The objective is to integrate Maria into the Navy's Global Command and Control System-Maritime (GCCS-M) or the GCCS Integrated Imagery and Intelligence program. The Space and Naval Warfare Systems Command, San Diego, California, is conducting the test program at the Undersea Warfare Center, Newport, Rhode Island.

**Underwater Communications & Tracking System for Submarines – Australia – 2003**

This project will evaluate the suitability of the Nautronix/Maripro underwater digital communication system for real-time data exchange of positional information between submarines participating in open ocean exercises. The "HAIL" system is a low-data-rate digital spread spectrum communications system for submarines using installed acoustic transmitter/receivers. The system has been demonstrated previously in joint U.S.-Australian submarine exercises, with great success. The Program Executive Officer, Submarines-Combat Systems Program Office, Naval Sea Systems Command will conduct the test program in coordination with the Commanders, Submarine Forces, U.S. Pacific and U.S. Atlantic Fleets, Naval Undersea Warfare Center, Newport Division, Rhode Island, and Commander, Operational Test and Evaluation Force. If satisfactorily tested, the HAIL system will be integrated into the Navy's AN/BQQ-10 A-RCI sonar system.

**U.S. MARINE CORPS****Assault Breacher Vehicle Mine Plow & Lane Marking System – United Kingdom, Israel – 2002**

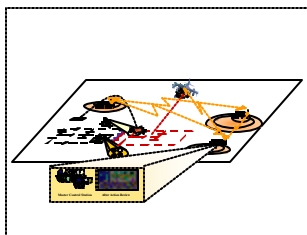
This project is evaluating foreign, non-developmental Full-Width Mine Plows and Lane Marking Systems manufactured by Pearson Engineering and Israel Aircraft Industries, RAMTA Division. These subsystems will be integrated into the Marine Corps' Assault Breacher Vehicle and tested to verify vendor performance claims and to satisfy the requirement for in-stride breaching capability, operational suitability, and shock and mine blast. The Marine Corps Systems

Command, Quantico, Virginia, is conducting the test program in conjunction with the Marine Corps Operational Test and Evaluation Activity, Aberdeen, Maryland, the Army's Waterways Experiment Station, Vicksburg, Mississippi, and the Marine Corps Air Ground Combat Center, Twentynine Palms, California.



**Communications Distribution System – Canada – 2002**

This project is evaluating a digital voice and data distribution system developed by Computing Devices and fielded in Marine Corps ground command and control systems, when integrated with the KC-130 aircraft for command post complexes ranging from Marine Expeditionary Force headquarters to squadron level. The Marine Corps Systems Command, Quantico, Virginia, is conducting the test program in conjunction with the Naval Air Warfare Center, Patuxent River, Maryland, Marine Air Support Squadron One, and the Naval Surface Warfare Center, Crane, Indiana. Test articles were delivered in FY 2002. Technical tests and KC-130 flight certification testing are underway, and a Limited Warfare Evaluation is planned for early FY 2003.

**Deployable Instrumentation for MAGTF (Marine Air Ground Task Force) Training – Sweden, Switzerland – 2003**

This project will evaluate mobile Range Instrumentation Systems developed by Saab Training Systems of Sweden and RUAG (formerly Swiss Electronics) of Switzerland to meet Marine Corps requirements to integrate current training devices which provide deployable force-on-force training for the Marine Air Ground Task Force. The evaluation will demonstrate the candidates' abilities to provide track reporting, engagement adjudication of simulated direct and indirect fire including battlefield audio and visual cues, and

recording of all movement and engagement criteria for use in exercise after-action reviews. The test program will be conducted by the Program Manager, Training Systems-Ranges and Instrumentation, Marine Corps Systems Command, Quantico, Virginia, and will include integration at the vendors' facilities and operational testing by Marine Corps Reserve infantry units at Marine Corps Base, Quantico.

**Eye-safe Laser Rangefinder for M1A1 BattleTank – Germany, United Kingdom –2003**

This project will evaluate eye-safe lasers developed by Zeiss of Germany and Thales (formerly AVIMO) of the United Kingdom, for range, beam divergence, output energy, shot life, receiver field of view, sustained rate of ranging, and other parameters used to locate distant targets for the M1A1 Firepower Enhancement Program. The eye-safe laser is expected to increase the range performance by 2000 meters. The Marine Corps Systems Command, Quantico, Virginia, will conduct the test program in conjunction with the Marine Corps Operational Test and Evaluation Activity, Aberdeen, Maryland, and the Army's Night Vision and Electronic Sensors Directorate, Fort Belvoir, Virginia.



**Floating Smoke Pot System– Germany – 2001**

This project is evaluating a Floating Smoke Pot manufactured by Diehl Munitionssysteme (formerly Comet Pyrotechnik) to replace the current K867 floating smoke pot for use in training and combat, on land and in water. The current floating smoke pot produces a smoke that possesses carcinogenic properties and a fuze that has experienced reliability problems. The German item adds infrared smoke emission to screen troops in low-light situations against night-vision devices. The test program is being conducted by the Marine Corps Systems Command, Program Manager for Ammunition, Quantico, Virginia, at the Naval Surface Warfare Center in Crane, Indiana. The test article contract was awarded in late FY 2001. First Article Acceptance Tests were completed at the manufacturer's facility in Goellheim, Germany, during FY 2002. Technical testing (Phase II of the test program) will be carried out in FY 2003 at the Naval Surface Warfare Center, Crane, Indiana.

**High Rate-of-Fire .50 Caliber Machine Gun (joint with Air Force) – Belgium – 2003**

This project will evaluate a cost-effective, high-rate-of-fire .50 caliber machine gun manufactured by FN Herstal, for use by Marine Corps UH-1N and CH-53E helicopters, to replace the obsolete .50 caliber machine gun currently in use. The FCT evaluation will also judge the gun for use on Air National Guard HH-60G rescue helicopters, integrated onto the External Gun Mount System. The Marine Corps Warfighting Laboratory, Quantico, Virginia, is conducting the test program in conjunction with the Naval Air Systems Command, Patuxent River, Maryland, and the Marine Aviation and Tactical Squadron, Yuma, Arizona.

**Lightweight Aluminum Track for Advanced Amphibious Assault Vehicle – Germany – 1999**

This FCT project is evaluating a lightweight aluminum track for the Marine Corps' Advanced Amphibious Assault Vehicle (AAAV). This track is a modification of an existing track manufactured by Diehl and is the lightest production track available for the AAAV weight class. Testing began in FY1999 and is continuing at the Marine Corps AAAV Technology Center, Woodbridge, Virginia, to obtain the reliability test data needed to evaluate this track. Track tests on two items to date have not met the test criteria by AAAV. However, the third track is expected to be 70 pounds lighter and more successful.



**Lightweight Diesel Driven Auxiliary Power Unit – Germany (joint with Army) – 2000**

This project is currently evaluating a lightweight high-speed diesel engine auxiliary power unit (APU), developed by Fischer Panda of Germany for commercial marine industry application, for use on the Marine Corps' Advanced Amphibious Assault Vehicle (AAAV). Successful qualification of this APU in a military environment could significantly reduce the production costs for the AAAV program. This is a joint project with the Army; if qualified, the German APU will also be considered for the Advanced Medium-Sized Mobile

Power Systems Program. Test article contracts were awarded to Fischer Panda and another candidate APU manufacturer, Mid-West Engines of the United Kingdom, in early FY 2000. Testing was initiated at the Army's Communications and Electronics Command Division test cells at Fort Belvoir, Virginia. The German APU met or exceeded all test criteria in FY 2001; however, the British candidate did not meet power and output requirements and its testing was discontinued in late FY 2001. Endurance testing is continuing at Fort Belvoir, with noise tests and on-board vehicle testing planned to begin in FY 2003.

**NBC Multipurpose Protective Sock – France, Germany, United Kingdom – 2002**

This project is evaluating candidate launderable socks developed by Paul Boye of France, Texplorer GmbH and Helsa-Werke GmbH of Germany, and Purification Products, Ltd. of the United Kingdom as integral components of the Joint Service Lightweight Integrated Suit Technology (JSLIST) ensemble. The multipurpose protective sock component of the ensemble must provide chemical/biological protection and friction protection to the foot when worn inside warfighter footwear. Initial chemical screening is in progress. The Marine Corps requires field durability and swatch testing by two independent

laboratories. Chemical and biological testing will begin in May 2003 at Dugway Proving Grounds, Utah, and at the Hazardous Material Research Center, Columbus, Ohio. A Milestone C decision is anticipated in November 2003.

**Skin and Open Wound Decontamination – Canada – 2001**

This project is evaluating a Reactive Skin Decontamination Lotion, developed by O'Dell Engineering, Ltd. and in use by Australian, Canadian, Dutch, and Irish military forces and medical personnel to decontaminate skin, open wounds, and equipment. O'Dell is teamed with Curtiss Laboratories of Ben Salem, Pennsylvania, and Leominster, Massachusetts, and E-Z-Em, Inc., Long Island, New York, for the evaluation. The goal is to assure that the lotion meets user requirements and obtains



U.S. Food and Drug Administration approval. The Marine Corps Systems Command at Quantico, Virginia, is conducting the test program in conjunction with the Army Medical Materiel Development Activity, Fort Detrick, Maryland; Aberdeen Test Center, Maryland; the Battelle Corporation in Columbus, Ohio; and Southern Research in Birmingham, Alabama. The Air Force medical community at the Human Systems Center, Brooks AFB, Texas, is following this evaluation, anticipating improvements in medical readiness. Live agent testing is complete, and preliminary tests show significant improvement in protection over the current Skin Decontamination Kit. The product is currently pending U.S. Food and Drug Administration approval for use.

**Special Effects Small Arms Marking System (SESAMS) – Canada – 2003**

This project will evaluate the safety and integration suitability of Simunition's 5.56mm linked low-velocity training munitions for the M249 Squad Automatic Weapon (SAW). The SESAMS is a user-installed weapons modification kit that allows the individual Marine to fire low-velocity marking ammunition at short range while precluding the weapon from firing live ammunition. The system must provide normal environment

cues, immediate target feedback, non-toxic primers, and a non-toxic marking medium. The test program will be conducted by the Program Manager, Training Systems-Ranges and Instrumentation, Marine Corps Systems Command at Quantico, Virginia, in coordination with the Marine Corps Operational Test and Evaluation Activity, Aberdeen, Maryland, and the Marine Corps Warfighting Laboratory at Quantico.

**AIR FORCE****Airborne Video Recorder/Replay System – France – 2001**

This project is evaluating a state-of-the-art recorder/replay system developed by Enertec to provide reliable, cost-effective alternative test equipment at the Air Force Flight Test Center for use on aircraft of all types. The French item is smaller, has more storage capacity, uses hard disk as storage, does not need external encoder/decoder units, and promises to be more reliable. The 412<sup>th</sup> Test Wing is conducting the test program at Edwards AFB, California. A test article contract was awarded in late FY 2001. Three dedicated flight test missions were flown in December 2002. Shortcomings were experienced with the Enertec recorder, and the project is temporarily "on hold" pending an Air Force decision on the way ahead.

**Eagle Vision Sensor Upgrades – France – 2002**

Eagle Vision is the Department of Defense's only deployable commercial satellite imagery receiving and processing ground station. This project is evaluating the improvement in Eagle Vision performance achieved by incorporating 2.5-meter resolution imagery from the French SPOT 5 satellite. The use of the most advanced commercial imagery products in aircrew mission planning and

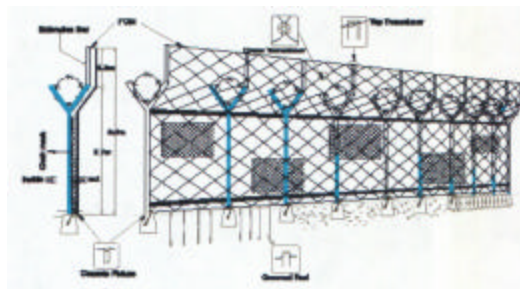
rehearsal systems provides a dramatic increase in aircrew/aircraft survivability and mission effectiveness. The imagery derived from Eagle Vision also makes an important time-critical contribution to U.S. intelligence analysts and topographic units. The Air Force Electronic Systems Center at Hanscom AFB, Massachusetts, is conducting the test program. The upgrade software has been procured and is ready for integration; however, the project will be delayed due to the deployment of the Eagle Vision system in support of Operations Enduring Freedom and Iraqi Freedom and in the war on terrorism.



**Fiber-Optic Security Fence – Republic of Korea – 2002**

This project is evaluating a perimeter fence, developed by Zinus, Inc., of the Republic of Korea, that continuously monitors laser pulses to detect and locate physical intrusion with high alarm reliability and a low false alarm rate. The system provides intrusion detection and requires minimal maintenance. It can be placed on existing fences or walls or used as a stand-alone fence. There are currently nine commercial installations in Korea

including Incheon International Airport, Pusan Nuclear Power Plant, Incheon Reservoir, and Seoul Communications Tower. The Air Force Electronic Systems Center, Force Protection Advanced Technology and Planning Program Office at Hanscom AFB, Massachusetts, is conducting the test program. Planning is in progress for testing by the 46<sup>th</sup> Test Squadron at Eglin AFB, Florida. System installation at the test site will begin in FY2003.

**Man-Portable Intrusion Detection System – United Kingdom – 2003**

This project will evaluate a wireless surveillance system developed by Sensor Electronics, Ltd., comprised of palm-sized passive infrared detectors that can be deployed from a briefcase. This sensor system promises to provide covert or overt, high-value item protection, standoff perimeter approach surveillance, or area protection for security forces deployed or in airbase ground defense operations. The Air Force's Electronic Systems Center-Force Protection and C2 Program Office at Hanscom AFB, Massachusetts, will conduct the test program with the 46<sup>th</sup> Test Squadron, Eglin AFB, Florida, and the Air Force Operational Test and Evaluation Command detachment at Eglin.

**Missile Reserve Battery Replacement – France, Japan – 2003**

This project will evaluate battery cells developed by Saft Alcatel of France and Japan Storage Battery, Ltd. (Nippondenchi) for use in missile/booster environments. With the decline of military missile development and downsizing of strategic forces, several U.S. battery manufacturers for these applications have discontinued production, leaving Eagle Picher as the only qualified U.S. source of batteries for missile/booster applications. The intent is for Eagle Picher to assemble the batteries with cells from candidate sources incorporating the newer technologies. The Air Force Space and Missile System Center's Peacekeeper Reuse Program Office at Kirtland AFB, New Mexico, will conduct the test program through a series of flight test demonstrations as part of the Air Force's ongoing Rocket Systems Launch Test Program.



**Plastic Practice Bombs – United Kingdom – Air Force – 2000**

This project is evaluating a plastic practice bomb manufactured by Portsmouth Aviation for use on Air Force aircraft such as the F-16, A-10, F-15, and B-52. The project will confirm the operational effectiveness and suitability of the candidate along with the potentially dramatic improvement to the environmental and economic aspects of Air Force training range cleanup. The

Air Logistics Command, Program Office for Paveway II and Bombs, Hill AFB, Utah, is conducting the test program. A test article contract was awarded in late FY 2000 and test rounds were delivered in FY 2001. Developmental tests by the 40<sup>th</sup> Test Flight at Eglin AFB, Florida were successfully completed in September 2002. Operational testing by the 28<sup>th</sup> Test Squadron at Nellis AFB, Nevada, began in November and is expected to be completed by the end of January 2003. It should result in the practice bomb being qualified on both the 6-bomb rack and 20-bomb triple-ejection rack.

**Rayon for Heatshield and Motor Nozzles – Austria, France, Germany, United Kingdom – 2003**

This project will evaluate high-quality rayon from Lenzing Technik of Austria, Snecma Moteurs of France, Acordis of Germany, and Acordis of the United Kingdom to meet Air Force requirements for use in high-temperature applications, such as heat shields and rocket motor nozzles. There are no longer any domestic suppliers of aerospace-grade rayon for rocket nozzles and reentry heat shield thermal protection, and dwindling stockpiles must be replaced for future systems. The Air Force Space and Missile Center's Peacekeeper Reuse Program Office at Kirtland AFB, New Mexico will conduct the test program.

**Self-Regulating Anti-g Ensemble – Germany/Switzerland – 2002**

This project is evaluating an advanced technology liquid-filled g-suit manufactured by the Swiss-German joint venture, Autoflug Libelle GmbH, that appears to be a major breakthrough over current "g protection."

Gravity-induced loss of consciousness plagues fighters at levels above 6g, and current equipment limits crews from achieving and maintaining sustained high-g maneuvers without significant risk and fatigue. Currently, Air Force fighter aircrews use a 1940s-technology pneumatic anti-g suit that is often the limiting factor in employing aircraft to their full operational capability. The Air Combat Command, Human Systems Integration

Division, Langley AFB, Virginia, is conducting the test program. The first phase of testing has been completed with mixed, but generally positive, results. After several important performance questions are answered, a decision to proceed into Certification Testing is planned for Fall 2003.

**Wideband Klystron for E-3 AWACS – United Kingdom – 2000**

This project is evaluating a wide-band klystron power amplifier manufactured by Thorn Microwave Division that promises greater reliability and much lower operating and maintenance costs. The current klystron power amplifier has a low mean-time-between-failure rate and is costly to repair. The British unit promises a 30-fold increase in reliability, increasing aircraft availability by 20 days when the Thorn klystron is incorporated into the AWACS fleet. The Air Logistics Command at Tinker AFB, Oklahoma, is conducting the test program. The latest test article contract was awarded in late FY 2001. Based on the positive results from testing to date, the AWACS program was plussed-up by \$24 million starting in FY 2004 to purchase the new Wideband Klystron. The AWACS Program Office opted not to wait for attrition of the old units but to start a replacement program as soon as the new tubes are delivered.

**U.S. SPECIAL OPERATIONS COMMAND****7.62mm Lightweight Machine Gun – Belgium – 2002**

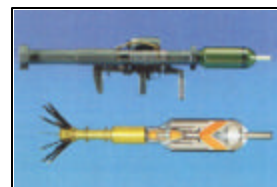
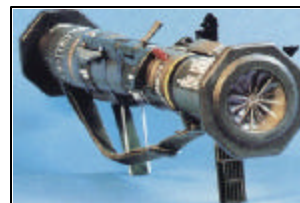
This project is evaluating a lightweight, durable and reliable 7.62mm machine gun manufactured by FN Herstal of Belgium to complement the organic firepower of Special Operations Forces Sea Air Land (SEAL) teams in operations ranging from low intensity conflict to direct action missions. Initial technical and operational testing was completed in FY 2002. Follow-on tests and a procurement decision are scheduled for FY 2003. The test program is being led by the Naval Surface Warfare Center in Crane, Indiana, on behalf of USSOCOM.

**40mm Enhanced Grenade Launcher for M4 Carbine – Germany, United Kingdom – 2003**

This project will evaluate grenade launchers from Heckler and Koch of Germany and Istech of the United Kingdom to determine if either can meet requirements for a more accurate and reliable weapon for Special Forces. The launcher would replace the current M203 40mm grenade launcher, which is over 30 years old and becoming logistically unsupportable. The test program will be conducted by the Naval Surface Warfare Center in Crane, Indiana.

**Advanced Demolition Weapons – Germany, Sweden– 2001**

This project is evaluating shoulder-fired weapons that can be fired from confined spaces and can meet a range of Special Operations Forces missions, including Military Operations in Urban Terrain, anti-armor, and direct engagement of targets in protected/covered areas. The most promising candidates are undergoing evaluation by the Army's Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey. USSOCOM users successfully evaluated the Bunkerfaust developed by Dynamit Nobel and Diehl of Germany in late FY 2001, and a limited quantity will be procured. Testing is underway for a U.S. configuration of the Swedish AT-4CS (Closed Space) weapon developed by Saab Bofors Dynamics which promises to meet fuze and insensitive munitions requirements. Aberdeen Test Center, Maryland, Yuma Proving Ground, Arizona, and the Naval Surface Warfare Centers at Crane, Indiana, and Indian Head, Maryland, are involved in the project.

**Advanced Lightweight Grenade Launcher Ammunition – Germany, Norway, Sweden – 1999**

This project is evaluating air-bursting ammunition manufactured by the Nordic Ammunition Company of Norway (Nammo), with support from Diehl of Germany and Saab Bofors Dynamics of Sweden, for use in USSOCOM's Advanced Lightweight Grenade Launcher acquisition program. The candidate ammunition promises the capability to engage targets in defilade positions or urban areas. The test program is being conducted by the Naval Surface Warfare Center at Crane, Indiana, and at the vendors' facilities in Europe. The test article contract was awarded in FY 2000 and further definitized in FY 2001. Testing is scheduled for completion in FY 2003.

**Body Armor Flotation Vest – Israel, United Kingdom – 2003**

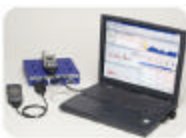
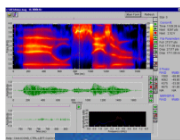
This project will evaluate inflatable body armor systems developed by Israel Military Industries of Israel, and Englands Ltd. of the United Kingdom. The systems protect against bullets and fragmentation, while providing the wearer with increased range of movement and comfort. The Program Manager, SOF Warrior Protection, at the Army's Natick Soldier Center, Natick, Massachusetts, will conduct the test program.

**Body-Worn Radar Receivers – United Kingdom – 2003**

This project will evaluate commercially available radar warning receivers developed by Filtronic Components and Spectrum Solutions, both from the United Kingdom, to determine if either provides critical threat warning and situational awareness to meet Special Forces requirements. The Joint Threat Warning Systems Program Office, USSOCOM, at MacDill AFB, Florida, will conduct the test program with the Support of the Navy Space and Naval Warfare Systems Center, Charleston, South Carolina.





**Global Cellular Phone System Optimization– Canada, Denmark, Sweden, UK – 2003**

This project will test and evaluate commercially available mobile cellular phone systems from various companies to determine if they provide increased range (using fewer signal repeaters), improved data throughput, reduced probability of signal detection or intercept, and improved security to meet Special Forces requirements. The Joint Threat Warning Systems Program Office, USSOCOM, at MacDill AFB, Florida, will conduct the test program with the support of the Navy's Space and Naval Warfare Systems Center, Charleston, South Carolina.

**Gunfire Detection System – France – 1999**

PILAR, manufactured by Metravib, is an acoustic detection system that determines azimuth, elevation, and range from a registered point to the origin of a shot. The original objective of this project was to evaluate the French item for Army fielding, to meet urgent requirements of U.S. European Command for operations in Bosnia and Kosovo. The project was transferred to USSOCOM management in early FY 2000. The Army Research Laboratory, Aberdeen Proving Ground, Maryland, and U.S. Special Forces elements successfully completed testing to support type classification for limited production; in early FY 2000, 8 systems worth approximately \$400,000 were delivered and deployed to Kosovo. Subsequently, the Metravib system was approved for further testing in tropical and urban environments to achieve full military type classification. USSOCOM procured an additional 52 systems (fixed site and mobile/vehicle variants) in FY 2001, worth approximately \$3.6 million, to provide an interim capability.

**MAAWS Infrared Illumination Round – Sweden– 2001**

This project is evaluating infrared illumination ammunition developed by Saab Bofors Dynamics for the 84mm Carl Gustaf recoilless rifle. The round has a reduced-sensitivity fuze that may meet new U.S. safety standards. This new round incorporates an infrared/near-infrared candle visible only with night-vision devices in place of a white-light candle visible to the naked eye. The Army's Armament Research, Development, and Engineering Center at Picatinny Arsenal, New Jersey, is conducting the test program for the Navy Special Warfare Command. Test rounds are being evaluated for safety and performance at Aberdeen Proving Ground, Maryland, and at the Naval Surface Warfare Centers at Crane, Indiana, and Indian Head, Maryland.



**Man-Portable Multi Sensor System – Denmark, France, Israel, Sweden, United Kingdom – 2001**

This project is evaluating lightweight, hand-held or portable sensors, developed by Metravib of France, and FLIR Systems and EXENSOR of Sweden, to meet requirements of the Joint Threat Warning System (JTWS). The sensor candidates offer capabilities including all-weather detection of ground and air vehicles and maritime and river vessels. As part of this FCT, specialized headsets/receivers/components developed by Source of Sound of Israel, NextLink of Denmark, Sordin of Sweden, and Racal/Davies of the United Kingdom are being evaluated for compatibility with Special Forces communications equipment and specialized personnel equipment. The headsets provide a ruggedized, waterproof communications capability. The USSOCOM Joint Threat Warning Systems Program Office and Legacy Force Protection Systems Office at MacDill AFB, Florida, is conducting the test program. Test article contracts were awarded in late FY 2001, and operational testing is underway.

**Man-Portable SATCOM (Satellite Communications) System– Sweden – 2003**

This project will evaluate small, lightweight satellite dishes manufactured by SweDish, that can provide one-person operations in a turnkey satellite communications solution. Two sizes of small dishes promise to provide secure communications (live video/audio streaming, broadband transmission and automated setup) without sacrificing the identity or location of the user. The USSOCOM Joint Threat Warning Systems Program Office and Legacy Force Protection Systems Office at MacDill AFB, Florida, will conduct the test program.

**MC-130H Aerial Refueling System Pod – United Kingdom – 1999**

This project is evaluating an advanced, versatile aerial refueling pod and drogue, manufactured by Flight Refuelling, Ltd., for the MC-130H Combat Talon II aircraft. The wing-mounted system can refuel slow helicopters and faster tilt-rotor aircraft during a single mission, providing a new, unique capability, and is a preplanned product improvement for the MC-130H being integrated by the Boeing Aircraft Company. The Air Force Materiel Command at Wright Patterson AFB, Ohio, is conducting the development, integration, and test program. After completing a successful demonstration phase, Phase II testing was initiated in FY 2002. Flight testing by the 46<sup>th</sup> Operations Group, Detachment 1, will begin in early FY 2003 at Hurlburt Field AFB, Florida. To support military requirements, the program is being accelerated to enable procurement in FY 2004.

**Parachute Leaflet Delivery System — Canada (joint with Army) – 1999**

This project is evaluating a Leaflet Delivery System developed by Mist Mobility Integrated Systems Technology Inc. against USSOCOM requirements for safer and more accurate delivery of psychological operations leaflets. Current leaflet delivery methods require risky manual dumping over targets at low altitudes, exposing U.S. aircraft and crews to increasingly complex threats during operations other-than-war and low-intensity conflicts. The Canadian system provides precision-guided autonomous waypoint navigation, and pinpoint delivery over long distances and high altitudes.



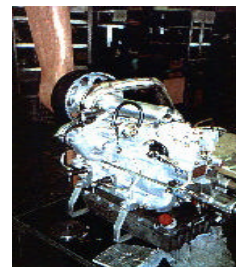
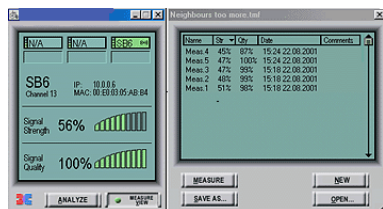
Performance testing at Yuma Proving Ground, Arizona, and at the Army Soldier Biological and Chemical Command at Natick, Massachusetts, as well as initial operational testing was completed successfully in FY 2002. Follow-on tests are underway at Yuma Proving Ground to demonstrate both ground launch and air-launch capabilities.

**Stand-Alone Cooling Suit – Canada, France, United Kingdom – 2002**

This project is evaluating lightweight cooling suits designed to regulate the body temperature of Special Operations Force personnel operating in environments with elevated temperatures or when wearing chemical protective garments. The suits being evaluated in the project are manufactured by Delta Temax of Canada, Eurodefhi of France, and W.L. Gore, Ltd. of the United Kingdom. Technical and laboratory testing is in progress by the Special Operations Forces Office at the Army's Soldier Biological and Chemical Command, Natick, Massachusetts.

**Ultra Light Aero Diesel Engine – Germany, United Kingdom – 2003**

This project will evaluate advanced diesel engines in the 100 horsepower range developed by Wankel Rotary and Thielart Aircraft Engines, both of Germany, and A-Tech Group, Wilksch Airmotive, and UAV Engines, all of the United Kingdom, for possible use on various Special Forces wind-supported air-delivery platforms.

**Wireless LAN (Local Area Network) Monitoring System – Finland – 2003**

This project will test and evaluate commercial lightweight, portable wireless LAN monitoring systems developed by Wlanbit to meet Special Forces requirements for a component of the Joint Threat Warning System (JTWS). The USSOCOM JTWS Program Office and Legacy Force Protection Systems Office at MacDill AFB, Florida, will conduct the test program

with support by the Navy Space and Naval Warfare Systems Center, Charleston, South Carolina.

**APPENDIX A**

**PARTICIPATION IN THE FCT PROGRAM**



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## PARTICIPATION IN THE FCT PROGRAM BY COUNTRY

The FCT Program depends for its success on the participation of our allies' and other friendly nations' defense industries and their world-class products. Table A1 lists the countries that participated in the FCT Program from FY 1980 through FY 2002, along with the OSD FCT funds provided to the Services and U.S. Special Operations Command to evaluate the products from these countries. Numerous FCT projects involved equipment from two or more countries, thus the total from column 2 will be greater than the number of total FCT projects that the FCT Program tracks. In addition, some FCT projects have resulted in the procurement of multiple items, thus the number of items selected for procurement is greater than the number of projects shown in Table A2.

**Table A1. COUNTRY PARTICIPATION IN THE FCT PROGRAM <sup>4</sup>**

Country	Number of FCT Projects	FCT Funds Provided (\$ million) <sup>5</sup>	Number of FCT Items Selected for Procurement	Value of Procurements (\$ million)
Australia	17	16.2	4	190.5
Austria	9	3.9	0	0
Belgium	12	5.1	1	1.7
Canada	48	49.8	10	140.5
Denmark	15	12.5	6	56.4
Finland	6	3.0	0	0
France	71	91.2	14	543.2
Germany	94	129.6	26	1,011.7
India	1	0.9	1	1.0
Israel	57	56.2	10	697.1
Italy	16	18.6	1	4.1
Japan	5	2.7	1	0.2
Netherlands	16	15.9	0	0
Norway	25	25.2	7	490.5
Republic of South Africa	4	2.8	2	22.1
Republic of Korea	4	0.4	0	0
Russian Federation	6	14.1	3	30.1
Singapore	1	0.2	0	0
Sweden	50	84.9	16	715.7
Switzerland	8	3.6	1	15.8
Taiwan	1	0.2	0	0
Ukraine	1	1.2	0	0
United Kingdom	166	272.2	49	2,099.4
Totals	633	810.4	152	6,020

<sup>4</sup> Table A1 includes projects conducted under the former OSD Foreign Weapons Evaluation (FWE) and NATO Comparative Testing (NCT) Programs between 1980 and 1989.

<sup>5</sup> Funds are shown in FY 2002 constant year dollars.

### DoD PARTICIPATION IN THE FCT PROGRAM

The principal objective of the FCT Program is to equip the U.S. warfighter with the world's best equipment by evaluating non-developmental items produced by allied and other friendly nations when the items demonstrate the potential to satisfy U.S. defense requirements more quickly and economically. Table A2 lists the participation of each of the Services and USSOCOM in the FCT Program through the end of FY 2002.

**Table A2. DoD PARTICIPATION IN THE FCT PROGRAM, FY 1980 – 2002**

Sponsor	Total Projects FY 1980-2002	Projects Completed in 2002	Projects Continuing from Previous Years, and Started, in FY 2002	Total Projects Meeting Requirement FY 1980-2002 <sup>6</sup>	Total Projects Resulting in Procurement <sup>7</sup>
Army	145	4	10	77	50
Navy	151	5	7	63	41
Marine Corps	40	2	8	22	15
Air Force	94	7	5	47	29
USSOCOM <sup>8</sup>	22	5	9	10	10
Totals	452	23	39	219	146

From 1980 through 2002, FCT projects resulted in procurement of about 66% of projects meeting the sponsor's requirements. With better definition of user requirements, and a clear focus on testing those items that address funded needs, the procurement rate of those items meeting U.S. requirements since 1995 has risen to nearly 80%.

<sup>6</sup> This number does not include projects that were technical assessments, failed the evaluation, or were terminated.

<sup>7</sup> Number represents projects sponsored by the Services or Special Operations Command that resulted in procurements through the end of FY 2002.

<sup>8</sup> The first USSOCOM project occurred in FY 1995, funded through the Navy FCT Office. Beginning with FY 1997, USSOCOM directly managed its own FCT projects rather than relying on the Services to propose and receive funding from OSD for FCT projects that related to USSOCOM requirements.

**APPENDIX B**

**EQUIPMENT SELECTED FOR PROCUREMENT  
AS A RESULT OF THE FCT PROGRAM**

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Table B1. EQUIPMENT PROCURED BY THE ARMY <sup>9</sup>

EQUIPMENT	COUNTRY	MANUFACTURER	YEAR
Optically-Improved Standard Advanced Dewar Assembly II	France	SOFRADIR	2002
Scanner Assembly for HTI B-Kit	United Kingdom	BAE Systems	2002
Afocal Assembly for HTI B-Kit	United Kingdom	BAE Systems	2002
High Mobility Excavator	Australia	Australian Defense Industries	2002
Mine Protected Clearance Vehicle (Buffalo)	South Africa	Denel-Mechem	2002
Anti-Jam GPS (Global Positioning) for Comanche EMD	United Kingdom	Raytheon Systems, Ltd.	2002
1.75/1.5-Watt Linear Drive Cooler	Germany	AEG Infrarot Modules	2001
7.62mm Short Range Training Ammunition	Canada	SNC Technologies	2001
L96/L97 Anti-Riot Grenade for LVOSS	United Kingdom	Pains-Wessex Defence	2001
Ground and Vehicle Mounting System	Germany	Sachtler GmbH	2000
Standard Advanced Dewar Assembly (SADA)-Type II	France	SOFRADIR	1999
Improved Mobile Subscriber Equipment UHF Radios	Canada, Israel	Canadian Marconi, Tadiran	1998
Powered Multi-Fuel Burner	Canada	Thermal Research	1998
Leguan Heavy Assault Bridge	Germany	MAN Technologies AG	1998
Gun Laying and Positioning System	Switzerland	Leica Heerbrugg	1998
Automatic Chemical Agent Detector Alarm Power Supply	United Kingdom	Graseby Dynamics	1998
Interim Vehicle Mounted Mine Detector	South Africa	Dorbyl/RSD	1997
1-Watt Linear Drive Cooler	Germany	AEG Infrarot Modules	1997
Ultra-Lightweight Camouflage Net System	Sweden	Diab-Barracuda	1997
2kW Generator Sets for Mobile Electric Power	Canada	Mechron	1996
Automatic Chemical Agent Detector Alarm	United Kingdom	Graseby Dynamics	1996
Long Wavelength Infrared Focal Plane Arrays	France	SOFRADIR	1995
Muzzle Velocity System	Israel	Reshef	1995
84mm HEDP Round for Carl Gustaf RAAWS	Sweden	Saab Bofors Dynamics	1994
60mm Mortar Training Cartridges and Refurbishment Kits	Israel	Salgad/Pocal	1993
HAWK Battery Loader-Transporter Modification Kit	Germany	Thyssen Nordseewerke	1993
Improved Chemical Agent Monitor and Retrofit Kits	United Kingdom	Graseby Ionics	1993
35mm Tank Precision In Gunbore Device HEAT Rounds	Germany	Diehl	1991
Anti-Magnetic Mine Actuating Device	Israel	Israeli Aircraft Industries	1990
Carl Gustaf M3 (RAAWS)	Sweden	Saab Bofors Dynamics	1990
Digital Signal Processor	Denmark	Weibel	1990
“Fox” NBC Reconnaissance Vehicle (NBCRS)	Germany	Thyssen Henschel	1990
NBCRS Lane Markers	Germany	F. Diehl	1990
NBCRS Mass Spectrometer	Germany	Bruker Franzen/Diehl	1990
NBCRS Navigation Instrument	Germany	Teldix	1990
105mm Lightweight howitzer	United Kingdom	Royal Ordnance	1988
105mm Tank Training Ammunition	Germany	Rheinmetall	1986
81mm Mortar Training Cartridge and Refurbishment Kit	Israel	Salgad/Pocal	1985
Improved 81mm Mortar and Ammunition	United Kingdom	Royal Ordnance	1985
120mm Mortar (Tampella)	Israel	Soltam	1985
Chemical Agent Monitor	United Kingdom	Graseby Ionics/ETG	1985
Kinetic Energy Recovery Rope	United Kingdom	Marlow Ropes, Ltd.	1985
5.56mm Plastic Training Ammunition with Bolt	Germany	Dynamic-Nobel	1984
Potable Water Tank	United Kingdom	Airborne Industries	1984
SANATOR Decontamination Unit	Norway	Karl H. Hoie/EASI	1984
4.2” Mortar Training Devices/Rounds	Germany	Nico Pyrotechnik	1983
.50 Caliber Plastic Training Ammunition with Device	Germany	Dynamit-Nobel	1983
AT-4 Anti-Armor Weapon	Sweden	Saab Bofors Dynamics	1983
Small Unit Support Vehicle	Sweden	Haaglands & Soner	1983
.22 Caliber Tank Training Ammunition	United Kingdom	EMI Eley	1982

<sup>9</sup> Year of first procurement is as shown. Because more than one Service may procure an item, total numbers of the projects listed in the tables in Appendix B will not match those totals shown in Table A2.

10 Ton Truck Transporter Vehicle	Germany	MAN GHH	1981
Combat Support Boat	United Kingdom	Fairey Allday Marine	1981
M72A3 LAW Anti-Tank Weapon	Norway	Raufoss	1981
NBC Marking Set	Germany	A. Diedr Dolmeyer	1981

**Table B2. EQUIPMENT PROCURED BY THE U.S. MARINE CORPS**

<b>EQUIPMENT</b>	<b>COUNTRY</b>	<b>MANUFACTURER</b>	<b>YEAR</b>
L96/L97 Anti-Riot Grenades for LVOSS	United Kingdom	Pains Wessex Defence	2002
Expeditionary Airfield Light Duty Mat (Mobi-Mat)	France	Deschamps	2002
40mm Target Practice Cartridge	Germany	Nico Pyrotechnik	2002
30mm APFSDS-Tracer Rounds for USMC AAV	Germany, Norway	Mauser, Raufoss	2001
Joint Service Combat Shotgun	Italy/Germany	Benelli/Heckler & Koch	2000
MTU-883 Diesel Engine for AAV	Germany	Moteren und Turbinen Union	1999
Aluminum Road Wheels for AAV	United Kingdom	GKN	1999
Digital Voice and Data System	Canada	Computing Devices	1998
NBC Analysis System	Denmark	Bruhn NewTech	1998
Minimum Operating Strip Lighting Kit	United Kingdom	Metalite Aviation Lighting	1998
Automatic Chemical Detector Alarm Power Supply	United Kingdom	Graseby Dynamics	1998
2KW Generator Set for Mobile Electric Power	Canada	Mechron	1997
Automatic Chemical Agent Detector Alarm (ACADA)	United Kingdom	Graseby Dynamics	1997
84mm Insensitive Munition HEAT Round for RAAWS	Sweden	Saab Bofors Dynamics	1996
Airtronic Light Oil Burner	Sweden/Luxembourg	Electrolux	1995
M72A3/A5 Light Anti-Tank Weapon	Norway	Raufoss/Talley Defense	1995
HAWK Battery Loader-Transporter Modification Kit	Germany	Thyssen Nordseewerke	1993
Improved Chemical Agent Monitor	United Kingdom	Graseby Dynamics	1993
Portable Target Scoring System	United Kingdom	BDL Systems, Ltd.	1992
Anti-Magnetic Mine Actuating Devices	Israel	Israel Aircraft Industries	1990
Lightweight CB Protective Garment	United Kingdom	Compton-Webb Ltd.	1990
“Fox” NBC Reconnaissance Vehicle (NBCRS)	Germany	Thyssen Henschel	1990
NBCRS Lane Markers	Germany	F. Diehl	1990
NBCRS Mass Spectrometer	Germany	Bruker Franzen/F. Diehl	1990
NBCRS Navigation Instrument	Germany	Teldix	1990
A-6 Raster Head-Up Display	United Kingdom	GEC Avionics	1988
Chemical Agent Monitor	United Kingdom	Graseby Dynamics	1985
SANATOR Decontamination Unit	Norway	Karl H. Hoie	1984

Table B3. EQUIPMENT PROCURED BY THE NAVY

EQUIPMENT	COUNTRY	MANUFACTURER	YEAR
Stealth Screen System	France	ACH Engineering	2002
Joint Protective Aircrew Ensemble	Germany	Blucher & Theodolf Fritsche	2002
BROACH Warhead for Joint Standoff Weapon	United Kingdom	BAE Systems	2001
Emergency Evacuation Hyperbaric Stretcher	United Kingdom	SOS, Ltd.	2001
High Pressure Pure Air Generator for F/A-18E/F	United Kingdom	Ultra Electronics	2001
Titanium Nitride Erosion-Resistant Coatings Process	Canada/Russia	MDS/PRAD	2001
Communications Faired Mast	United Kingdom	Thomson Marconi Sonar	2000
DYAD Magnetic Sweep	Australia	Australian Defense Industries	2000
HMX Explosives Compounds	Norway	Dyno Nobel	2000
Passenger Anti-Exposure Survival System	United Kingdom	Multifab Survival	2000
Submarine Escape and Immersion Ensemble	United Kingdom	Beaufort/Hale Hamilton	2000
Atmospheric Diving Suit (Newtsuit)	Canada	International Hard Suit	1999
Automatic Chemical Detector Alarm Power Supply	United Kingdom	Graseby Dynamics	1998
2kW Generator Set for Mobile Electric Power	Canada	Mechron	1997
Automatic Chemical Agent Detector Alarm (ACADA)	United Kingdom	Graseby Dynamics	1997
Acoustic Cladding Underwater Repair System	United Kingdom	UMC International	1997
MA-31 Supersonic Sea Skimming Target Missile	Russia	Zvezda Strela	1997
84mm Insensitive Munition HEAT Round for RAAWS	Sweden	Saab Bofors Dynamics	1996
Digital Flight Control System for F-14	United Kingdom	GEC Marconi	1996
GIANT Infrared Decoy System	Germany	Buck Technologies	1996
T-45 Trainer Digital Cockpit Display	United Kingdom	Smiths Industries	1996
Long Wavelength Infrared Focal Plane Arrays	France	SOFRADIR	1995
Forward Area Degaussing Range	United Kingdom	Ultra Electronics	1995
High-Pressure Pure Air Generator for AV-8B & AH-1	United Kingdom	Ultra Electronics	1995
IFF Tracker System for EW Training	United Kingdom	Cossar	1995
M72A3/A5 Light Anti-Tank Weapon	Norway	Raufoss/Talley Defense	1995
Spray-Formed Alloy 625 Process for Submarine Piping	Sweden	AB Sandvik Steel	1995
BOL Chaff Countermeasures System	Sweden/UK	Saab Tech/Chemring	1993
Cowan Transportable Recompression Chamber	Australia	Cowan Manufacturing	1993
Impressed Current Cathodic Protection System	United Kingdom	Widney Aish	1993
Improved Chemical Agent Monitor	United Kingdom	Graseby Dynamics	1993
EHF Traveling Wave Tubes	Germany	Siemens	1992
MK48 Torpedo Wire Guidance (Hosepipe)	United Kingdom	Marconi Underwater Systems	1992
SAM Remote-Controlled Minesweeper	Sweden	Karlskronavarvet	1991
Penguin Missile & Guidance Unit	Norway	Norsk Teknologi	1991
Infrared Imaging System	Israel	El-Op, Tadiran	1991
Aerial Target Vector Scoring	United Kingdom	Cambridge Consultants	1990
MCM-1 Tactical Displays	United Kingdom	Plessey Naval Systems	1990
Night Vision Goggles (Cats Eyes)	United Kingdom	GEC Avionics	1990
TICM FLIR with Thermal Cueing Unit	United Kingdom	GEC Avionics	1990
A-6 Raster Head-Up Display	United Kingdom	GEC Avionics	1988
ASW Acoustic Processor	Canada	Computing Devices	1988
E-2C Multifunction Control Display Unit	Canada	Marconi of Canada	1988
Maritime Decoy (Rubber Duck)	United Kingdom	Irvin Industries	1988
Versatile Exercise Mines	United Kingdom	BAeSEMA	1987
Chemical Agent Monitor	United Kingdom	Graseby Dynamics	1985
SANATOR Decontamination Unit	Norway	Karl H. Hoie	1984
.50 Cal. Multipurpose Ammunition	Norway	Raufoss	1981
Combat Support Boat	United Kingdom	Fairey Allday Marine	1981
Integrated Communications System III	United Kingdom	Marconi	1980

**Table B4. EQUIPMENT PROCURED BY THE U.S. SPECIAL OPERATIONS COMMAND**

EQUIPMENT	COUNTRY	MANUFACTURER	YEAR
Joint RAAWS Upgraded Ammunition-Phase II	Sweden	Saab Bofors Dynamics	2002
Advanced Demolition Weapons (AT-4CS)	Sweden	Saab Bofors Dynamics	2002
Large Aircraft Interior Decontamination	Germany	Odenwald-Werke Rittersback	2002
Patrol Coastal Decoy System (Super Barricade)	United Kingdom	ML Aviation	2002
21mm Trainer for M72 Light Anti-Armor Weapon (LAW)	Norway	Nordic Ammunition Co.	2001
Joint RAAWS Upgrade Ammo (HEAT551C[IM], TPT141	Sweden	Saab Bofors Dynamics	2001
5.56mm Lightweight Machine Gun	Belgium	FN Herstal	2000
Maritime Craft Air Deployment System II	United Kingdom	Aircraft Materials, Ltd.	1999
Gunfire Detection System-PILAR	France	Metravib	1999
Maritime Craft Air Deployment System	United Kingdom	Aircraft Materials, Ltd.	1998
Long Wavelength Infrared Focal Plane Arrays	France	SOFRADIR	1995
Carl Gustaf M3 Ranger Anti-Armor Weapon (RAAWS)	Sweden	Saab Bofors Dynamics	1994
LI-465 Fuzes for PGU-9AB Ammunition	Sweden	Saab Bofors Dynamics	1993
40mm HEI Round (PGU-37B) for AC-130 Gunship	Sweden	Saab Bofors Dynamics	1993

**Table B5. EQUIPMENT PROCURED BY THE AIR FORCE**

EQUIPMENT	COUNTRY	MANUFACTURER	YEAR
Retractable Arresting Cable System	France	Aérazur (Zodiac Group)	2002
Infrared/UV Threat Stimulator	United Kingdom	Elettronica UK, Ltd.	2001
Emergency Evacuation Hyperbaric Stretcher	United Kingdom	SOS, Ltd.	2001
F-15 Countermeasures Dispenser (BOL)	Sweden	Saab Tech (formerly Celsius)	2001
Emergency Aircraft Arresting System	France	Aérazur (Zodiac Group)	2000
Next Generation Small Loader	Australia	Static Engineering with FMC	2000
Uncooled Thermal Imager	Sweden	FLIR Systems	1999
Renaissance View Satellite Data Upgrade	France, Canada	EADS, IOSAT of Canada	1999
600-Gallon Fuel Tanks for F-16	Israel	Israel Aircraft Industries	1999
Eagle Vision and Eagle Vision with LANDSAT Upgrade	France	EADS (formerly Matra CAP)	1998
Automatic Chemical Agent Detector Alarm Power Supply	United Kingdom	Graseby Dynamics	1998
Electronic Warfare Management System	Denmark	Terma	1997
Multi-Scanner for Aging and Surveillance	Germany	Fiedler Optoelectronik Ltd.	1997
MILSTAR Traveling Wave Tube	France	Thomson Tubes Electroniques	1997
Pressure Sensitive Paint for Wind Tunnel Applications	Russia	OPTROD, Ltd.	1996
Automatic Chemical Agent Detector Alarm (ACADA)	United Kingdom	Graseby Dynamics	1996
Modular Reconnaissance Pod	Denmark	Per Udsen (Terma)	1996
Long Wavelength Infrared Focal Plane Arrays	France	SOFRADIR	1995
Enhanced Electronic Warfare Scenario Generator	United Kingdom	Data Sciences	1994
Pylon Integrated Dispenser	Denmark	Per Udsen (Terma)	1993
I-800 (HAVE NAP) Warhead	Israel	Israel Military Industries	1992
SPOT Satellite Digital Imagery	France	SPOT Image Corporation	1990
ALE-40 Digital Sequencer Switch	Denmark	Terma Elektronik	1990
NBC Aircrew Protective Suit Fabric	Germany	Blucher/Celanese Corp.	1990
Millimeter Wave Communications	Japan	Nippon Electric	1989
Dielectric Measurement Equipment	France	Aérospatiale	1989
HAVE NAP Stand-Off Weapon	Israel	Rafael	1989
Munitions Ejector Release Unit	Germany	Alkan/EDO	1986
Chemical Agent Monitor	United Kingdom	Graseby Dynamics/ETG	1985
Rapid Runway Repair Equipment	Germany	Christiansen Diamond Products	1985
SANATOR Decontamination Unit	Norway	Karl H. Hoie/EASI	1984
DURANDAL Runway Attack Weapon	France	Matra	1983
10 Ton Truck Transporter Vehicle	Germany	MAN GHH	1981

**APPENDIX C**

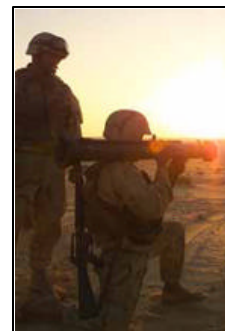
**FCT-EVALUATED EQUIPMENT  
SUPPORTING U.S. FORCES**



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### EXAMPLES OF FCT-EVALUATED EQUIPMENT FIELDIED IN U.S. OPERATIONS

**Operation:** Operations Enduring Freedom and Iraqi Freedom  
**Project:** Advanced Demolition Weapons  
**Country:** Germany, Sweden  
**Manufacturer:** Diehl Munitions GmbH, Saab Bofors Dynamics  
**Description:** U.S. Special Operations Command completed a limited safety qualification for procurement of a small quantity of AT-4CS (confined space 84mm shoulder-fired weapon) from Saab Bofors Dynamics, and the Bunkerfaust (lightweight fortification defeat weapon) from Diehl Munitions GmbH, for deployment in Afghanistan in Operation Enduring Freedom and in Iraq in Operation Iraqi Freedom.



**Operation:** Operations Enduring Freedom and Iraqi Freedom  
**Project:** Expeditionary Airfield Light Duty Mat System  
**Country:** France  
**Manufacturer:** Deschamps  
**Description:** First Marine Expeditionary Forces deployed to the Afghanistan and Iraq operating areas with the “Mobi-Mat” system, allowing them to quickly set up stabilized landing areas for medical evacuation and Forward Ammo and Refueling Points for rotary-wing aircraft operations.



**Operation:** Operation Enduring Freedom and Iraqi Freedom  
**Project:** Standard Advanced Dewar Assembly-Type II, and One Watt Linear Drive Coolers  
**Country:** France  
**Manufacturer:** SOFRADIR  
**Description:** With the deployment of the 1<sup>st</sup> Cavalry Division and the 4<sup>th</sup> Infantry Division to the Middle East, Abrams Tanks and Bradley Infantry Fighting Vehicles are being inserted into the theater of operations in support of Enduring Freedom and Iraqi Freedom with an unrivaled day/night, all-weather capability to engage targets and provide situational awareness. This capability is provided by the HTI/2<sup>nd</sup> Generation FLIR systems in the platforms’ sights, many of which have SADAs developed by SOFRADIR of France and One Watt Linear Drive Coolers developed by AEG Infrarot Modules of Germany.

**Operation:** Kosovo, Operation Enduring Freedom  
**Project:** Ground and Vehicle Mounting System (GVMS)  
**Country:** Germany  
**Manufacturer:** Sachtler GmbH  
**Description:** The GVMS is a proven advanced tripod/yoke assembly which permits operation of the Army’s Long Range Advanced Scout Surveillance System, allowing smooth pointing of the sensors in both mounted and dismounted configurations. The GVMS is with units deployed to Kosovo supporting Task Force Falcon, and with U.S. Special Forces in Afghanistan in Operation Enduring Freedom and Iraq in Operation Iraqi Freedom, as well as fielded with the 4<sup>th</sup> Infantry Division and 1<sup>st</sup> Cavalry Division at Fort Hood, Texas, and with the 1<sup>st</sup> Stryker Brigade Combat Team out of Fort Lewis, Washington. Additional units are being deployed to U.S. Forces in Kuwait.



**Operation:** TWA 800 Crash Recovery (1997), Pennsylvania Mine Rescue (2002)

**Project:** Transportable Recompression Chamber

**Country:** Australia

**Manufacturer:** Cowan

**Description:** The MK 6 Transportable Recompression Chamber provides the ability to provide immediate on-site treatment of decompression sickness. Navy Underwater Construction Team Two supported deep-water recovery operations after the explosion and crash of TWA flight 800 in the Atlantic off Long Island, New York in 1997. During the operation, the recompression chamber was successfully used to treat an injured diver under emergency conditions. Nine units were deployed to the drilling site in Somerset, Pennsylvania, as part of the operation to rescue the coal miners trapped underground at the Black Wolf mine in July 2002.



**Operation:** Bosnia, Operation Enduring Freedom, Homeland Security

**Project:** Wide Area Uncooled Thermal Imager

**Country:** Sweden

**Manufacturer:** FLIR Systems

**Description:** The thermal imagers were used extensively and with great success by security forces in Bosnia for protection of fixed installations. By FY 2002, over 100 have been deployed world-wide as part of the Air Force's Tactical Automated Security System, in such locations as Saudi Arabia, Afghanistan, Minot AFB, North Dakota, and Kirtland AFB, New Mexico.



**Operation:** Bosnia and Kosovo

**Project:** Anti-Riot Grenade

**Country:** United Kingdom

**Manufacturer:** PW Defence, Ltd. (formerly Pains-Wessex)

**Description:** Army Military Police, and other selected small units on patrol duty in Bosnia and Kosovo, carry these grenades to employ as required as a less than lethal counter for crowd control and/or riot suppression operations.



**Operation:** Bosnia and Kosovo

**Project:** Weather Forecasting System

**Country:** United Kingdom

**Manufacturer:** The MET Office, British MoD

**Description:** This system was qualified but not selected for further procurement due to its cost; however, it provided all of the weather forecasting support for operations in Kosovo and is still in operational use.

**Operation:** Midwest Flood Assistance (1997) and Bosnia

**Project:** Combat Support Boats

**Country:** United Kingdom

**Manufacturer:** Fairey Allday Marine

**Description:** During the serious floods in the Midwest in the late spring and summer of 1997, the U.S. Army and Army National Guard engineer units provided support to state and local officials. Combat Support Boats were used for recovery operations, transporting supplies, and assisting in the repair and construction of bridges. In Bosnia, the flood-swollen Sava River was a major obstacle to accomplishing U.S. national security objectives. Combat Support Boats were essential to rapidly assembling and maintaining the military bridge that U.S. forces used to cross the Sava River into Bosnia.



**Operation:** Enforcement of UN Sanctions on Iraq and Operation Enduring Freedom

**Project:** BOL Chaff System

**Country:** Sweden, United Kingdom

**Manufacturer:** Saab Tech, Chemring Ltd.

**Description:** The BOL Chaff system significantly improves protection against missile threats. Navy F-14 carrier-based aircraft, such as those flown in support of UN sanctions on Iraq, and those operating in Enduring Freedom, are equipped with this system. Navy commanders have stated that this is one of the best survivability enhancements in the F-14's history.

**Operation:** Kosovo, Operation Enduring Freedom

**Project:** Automatic Chemical Agent Detector Alarm (ACADA)

**Country:** United Kingdom

**Manufacturer:** Smiths Detection (formerly Graseby Dynamics)

**Description:** The ACADA detects both nerve and blister agents and is the Army's first approved and fielded dual-point mode chemical agent detector and alarm. ACADA is the standard detector for all Army units and is currently deployed worldwide, and in use to protect domestic high-value installations, including the Pentagon.

**Operation:** Operations in Desert Storm, Bosnia, Kosovo, and Enforcement of UN Sanctions on Iraq,

**Project:** Improved Chemical Agent Monitor

**Country:** United Kingdom

**Manufacturer:** Graseby Dynamics

**Description:** The Improved Chemical Agent Monitor (ICAM) is a hand-held point detector/monitor and can be used by personnel inspecting vehicles, buildings and other structures. The ICAM is the Army's standard monitor and is deployed in all theaters. U.S. inspectors on United Nations inspection teams in Iraq used the ICAM to identify areas where chemical munitions may have been produced, stored, or transported. U.S. Forces in Bosnia, Kosovo, and Operation Desert Storm also employed the ICAM.



**Operation:** Bosnia

**Project:** Anti-Magnetic Mine Actuation Device

**Country:** Israel

**Manufacturer:** Israel Aircraft Industries, Ltd.

**Description:** The Anti-Magnetic Mine Actuation Device provided the Army and Marine Corps a new capability for ensuring that land mines were cleared prior to the employment of troops. This

system was used in Bosnia on the M1 tank and during Operation Desert Storm on both M60 and M1 tanks.

**Operation:** **Bosnia, Kosovo, Desert Storm, and Republic of Korea**

**Project:** **Fox NBC Reconnaissance Vehicle**

**Country:** Germany

**Manufacturer:** Thyssen-Henschel

**Description:** The Fox NBC Reconnaissance Vehicle is equipped with state-of-the-art sensors for detecting chemical and biological agents. The Fox vehicle is deployed whenever there is a threat of chemical-biological warfare. The vehicle performed admirably during Operation Desert Storm and was used by U.S. forces in Bosnia and Kosovo to identify areas where munitions may have leaked. Several Fox systems are deployed in the Middle East and with U.S. troops in the Republic of Korea.



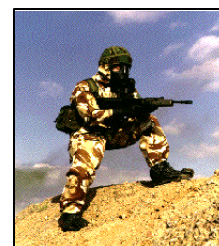
**Operation:** **Desert Storm**

**Project:** **Lightweight Chemical/Biological Protective Garment**

**Country:** United Kingdom

**Manufacturer:** J. Compton Sons and Webb, Ltd.

**Description:** Marine infantry units were equipped with these lightweight chemical/biological protective garments for self-protection against potential chemical and/or biological warfare attacks.



**Operation:** **Desert Storm, Somalia, Bosnia, Kosovo, and Operation Enduring Freedom**

**Project:** **SPOT Satellite Digital Imagery, Eagle Vision Satellite Imagery Receiving and Processing Ground Station**

**Country:** France, Canada

**Manufacturer:** SPOT Image Corporation, EADS (formerly Matra CAP), IOSAT Corporation

**Description:** SPOT Satellite imagery was downlinked directly to U.S. Forces in Bosnia and is currently being used in support of Enduring Freedom and Iraqi Freedom operations. SPOT provides U.S. Air Force pilots with imagery that allows near real-time practice flyovers and provides ground commanders with valuable intelligence data in support of mission planning. Frequently, these are the only up-to-date images available to pilots prior to their air strike missions. Eagle Vision is routinely used in support of exercises such as Cope Thunder and Green Flag and is currently on deployment.

**Operation:** **Desert Storm**

**Project:** **Self-Propelled Acoustic-Magnetic Minesweeper**

**Country/Mfr:** Sweden

**Manufacturer:** Karlskronavarvet

**Description:** The Self-Propelled Acoustic-Magnetic Minesweeper gave U.S. Naval Forces the capability to conduct remote minesweeping in shallow water. These units were used during and after the Gulf War to search for and clear enemy naval mines.



**Operation:** **Enforcement of UN Sanctions on Iraq**

**Project:** **Pylon Integrated Dispenser, Electronic Warfare Management System**

**Country:** Denmark

**Manufacturer:** Per Udsen, Terma

**Description:** The Pylon Integrated Dispenser (PIDS-3) and Electronic Warfare Management System are currently in use on Air Force Reserve A-10 and F-16 aircraft operating in Northern and Southern Watch.





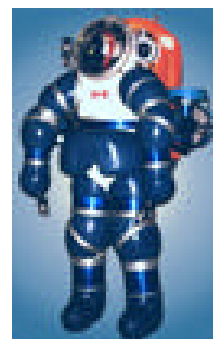
### EXAMPLES OF FCT-EVALUATED EQUIPMENT RESULTING IN IMPROVED OPERATIONAL CAPABILITIES

**5.56mm Lightweight Machine Gun.** The MK46 Mod0 is a compact, belt-fed machine gun, manufactured by FN Herstal of Belgium, that significantly increases the organic firepower of Naval Special Warfare/U.S. Special Forces SEAL platoons without impacting tactical load bearing constraints. Substantially lighter than the 7.62mm MK43 machine gun and M249 squad automatic weapons in inventory, the MK46 is highly reliable and remarkably flexible, with improved rails for scope, laser, and light attachments. Full operational capability was obtained in July 2002 when 492 weapons were delivered to the Special Forces.



**7.62mm Short Range Training Ammunition.** The 7.62mm training cartridge developed by SNC Technologies of Canada is designed for use on ranges where bullets traveling beyond standard target distances pose safety problems. The Canadian round can be used safely with no damage to training sites. This ammunition will enhance live-fire training for small unit tactics at military operation urbanized terrain sites and small arms range areas worldwide that are being reduced in size.

**Atmospheric Diving Suit (NewtSuit).** The Navy's ADS2000, developed by Ocean Works International Corporation. (formerly International Hardsuit, Inc.) of Vancouver, British Columbia, is a key unit of the Navy's Submarine Rescue, Diving, and Recompression System. The interior of the ADS 2000 remains at one atmosphere, allowing the pilot to operate at depths of 2000 feet (salt water). Qualified by the Navy through FCT tests at Naval Surface Warfare Center, Carderock, Maryland, and Navy Experimental Diving Unit, Panama City, Florida, the first ADS unit was delivered to the Navy in 1998, and three additional suits are awaiting final system certification.



**Automatic Chemical Agent Detector Alarm (ACADA).** Manufactured by Smiths Detection (formerly Graseby Dynamics), United Kingdom, the GIDS-3 was selected as the winning candidate for the Automatic Chemical Agent Detector Alarm requirement in 1996. The sensitive detectors are emplaced for remote detection and add a nerve agent capability that the previous M43A1 detector does not possess. An advanced **Power Supply for ACADA**, providing improved unit reliability and significant weight reduction, was qualified under FCT in FY1998 and is being procured with each ACADA unit. Over 22,000 units have been procured for the Joint Service requirement, for both domestic and international use.

**BOL Chaff Countermeasures Dispenser for Navy F-14 and Air National Guard F-15.** The dispenser manufactured by Saab of Sweden uses chaff produced by Chemring Ltd. of the United Kingdom. This system increases the amount of chaff carried in the LAU-7 launchers fitted on the Navy's F-14 Tomcat aircraft. Navy pilots have stated that it is arguably one of the best survivability enhancements in the F-14's history. The BOL Chaff/IR system was successfully qualified under FCT in FY 2001 for Air National Guard F-15s and was initially procured for those aircraft. The Swedish system is being procured for all Air Force F-15 A/C and is being considered for F-16 A/C.

**Digital Flight Control System for F-14.** Manufactured by GEC Marconi of the United Kingdom, this system has solved the Navy's number one flight safety issue for the F-14 aircraft. The Navy had lost 35 F-14 aircraft due to unrecoverable flat spins. Since the FCT procurement, no aircraft have been lost due to flat spins.

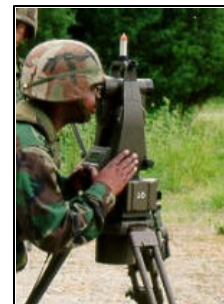


**Electronic Warfare Management System.** The EWMS, manufactured by Terma Elektronik AS of Denmark, is an integrated and programmable electronic warfare unit which replaces individual cockpit controls with centralized control of the electronic combat (EC) suite in the F-16 and A-10 aircraft. This includes up-front presentation of all EC status, in-flight selection of chaff/IR dispense programs, and full night-vision capability. All Air National Guard F-16 and A-10 aircraft will have this system, with over 1,412 systems delivered to date.



**Emergency Evacuation Hyperbaric Stretcher.** Developed by SOS, Ltd., of the United Kingdom, portable, collapsible chambers are used to transport diving personnel suffering from decompression sickness or gas embolism to a recompression treatment chamber. Initial procured units went to Deep Submergence Unit in San Diego, California, and Mobile Diving and Salvage Unit One in Pearl Harbor, Hawaii, and will significantly improve Navy diving capabilities. When integrated into the Navy's Submarine Rescue Diving and Recompression System, it will be a significant addition to submarine rescue operations. The Air Force also tested these units under Navy lead and initially deployed one unit to Johnson Atoll in the Pacific for an emergency, and to Brooks AFB, Texas for operational aeromedical use.

**Gun-Laying and Positioning System (GLPS).** Manufactured by Leica Heerbrugg of Switzerland, GLPS significantly improves the warfighter's capability to quickly and accurately position a battery of non-Paladin howitzers. By using a global positioning system (GPS) receiver with satellite input, GLPS gives accurate position and reduces gun-laying time by more than one-third.

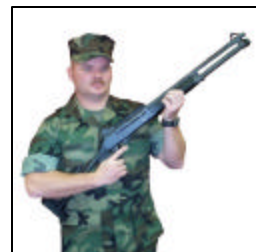


**High Pressure Pure Air Generator (HiPPAG).** Manufactured by Ultra Electronics Weapon Systems of the United Kingdom, HiPPAG replaces the nitrogen bottles used to cool Sidewinder missile seekers on Marine Corps AV-8B and AH-1 aircraft. Also successfully completed in FY 2001 was the FCT evaluation of the **HiPPAG for Navy F/A-18E/F**, which is being introduced in that fleet of aircraft. Current flight operations with nitrogen bottles are costly and manpower-intensive to maintain, and due to capacity of the bottles, restrict the time the AIM-9M is available for self-protection/kill.

**High Mobility Engineer Excavator.** The Australian Defense Industries' excavator, now being produced in partnership with Oshkosh Truck Corporation of Wisconsin, is a self-deployable vehicle for ditching, trenching, loading, and other related engineer missions, which can maneuver at speeds up to 65 mph on improved roads, better supporting the distributed operations of Force XXI.

**Joint Ranger Anti-armor, Anti-personnel Weapon System and Family of Upgraded Ammunition.** Manufactured by Saab Bofors Dynamics of Sweden, the 84mm Joint Ranger Anti-armor, Anti-personnel Weapon System is a versatile, portable, and lethal shoulder launched weapon system that fires a large suite of ammunition. The system is in use by the Army 75<sup>th</sup> Ranger Regiment, Special Forces SEAL Teams, and other U.S. forces. Upgraded ammunition developed by Saab Bofors Dynamics, including HEAT, HEDP, HE, and ADM, conforming to U.S. insensitive munitions requirements, has completed testing under FCT and fielded, or is near being fielded, thereby significantly expanding the weapon's capabilities.

**Joint Service Combat Shotgun.** This 12-gauge shotgun, developed by Benelli of Italy teamed with Heckler & Koch of Germany, is replacing all pump-action shotguns currently in use by the Marine Corps with a common lightweight, highly reliable, semi-automatic weapon, significantly increasing individual firepower.



**Large Aircraft Interior Decontamination.** Adopted and procured by USSOCOM to provide a response to an immediate military need, these systems provide the capability to decontaminate sensitive equipment. Developed by Odenwald Werke Rittersback of Germany, the Decofogger and Cobra systems provide light-weight, man-portable decontamination capability to deployed Special Operations Forces.

**Mine Protected Clearance Vehicle (“Buffalo”).** Provides significant and improved protection to crewmembers engaged in countermine operations-detection and disposal. The vehicle has sufficient space to accommodate two operators at stations, a driver, mechanical-arm operator, and vehicle commander. The vehicle itself is repairable in 12 hours after a mine detonation event. The “Buffalo” is manufactured by Deneb-Mechem of the Republic of South Africa, in partnership with Technical Solutions Group of Charleston, South Carolina.

**Powered Multifuel Burner.** Type-classification and fielding of the “Modern Burner,” manufactured by International Thermal Research of Canada, marked a historical milestone by eliminating age-old Army dependence on gasoline. Coupled with the successful FCT and procurement of the **2KW Generator Sets**, manufactured by Mechtron Energy, Ltd. of Canada, the warfighter will now use JP-8 fuel in the field, an inherently safer fuel common across the Army vehicle fleet.



**Submarine Escape and Immersion Ensemble.** The British-developed submarine escape and immersion ensemble Mark 10 will allow U.S. Navy crews to escape from a disabled submarine at much greater depths than the current escape system and survive on the surface until they are rescued. Developed by Beaufort Air-Sea, with associated submarine valve sets manufactured by Hale Hamilton of the UK, the suit covers the submariner completely, provides thermal protection, and includes an individual life raft. In 2000 the USS TOLEDO became the first U.S. submarine to have the fully operational and certified British escape system. Since then, twelve other SSN-688 Class submarines have received the system. All Los Angeles Class submarines will eventually be equipped with this system.

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**APPENDIX D**

**BENEFITS OF THE FCT PROGRAM**

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### REDUCED ACQUISITION COSTS AND ACCELERATED FIELDING

The use of a non-developmental approach to acquisition reduces new-start development costs. The gap between identifying a requirement and putting the needed equipment in the hands of our operational forces is also reduced in many cases. Table D1 shows examples of estimated development cost avoidance and accelerated fielding times as a result of successful FCT projects since 1980. Estimated production cost savings and reduced life cycle costs are also noted, where applicable.

**Table D1. EXAMPLES OF DEVELOPMENT COST AVOIDANCE<sup>10</sup>**

FCT Project and Sponsor	RDT&E Cost Avoidance (\$M)	Production Cost Savings (\$M)	Life-Cycle Cost Savings (\$M)	Estimated Development Time Savings
2Kw Generator Sets - Army	2.3	33	25	2 years
5.56mm LtWt. Machine Gun - USSOCOM	6.4			-
30mm APFSDS Rounds for AAV - USMC	>20			-
105mm Lightweight Howitzer - Army	167			-
Airtronic Light Oil Burner - USMC	12.7			4-8 years
Anti-Riot Grenade - Army and USMC	12			2 years
Atmospheric Diving Suit (NewtSuit) - Navy	20			-
Automatic Chemical Agent Detector Alarm-Army	279	64		4 years
Digital Flight Control System for F-14 – Navy	122		50-150	5 years
Emergency Aircraft Arresting System	10	8.9	6.1	4 years
Fuchs NBC Reconnaissance Vehicle - Army	750		100	14 years
High Mobility Excavator - Army	5			-
High Pressure Pure Air Generator (AV-8, UH-1, F/A-18E/F - Navy	2.2	23.5	50.2	-
Improved Chemical Agent Monitor - Army	2	4.1		6 years
Joint Protective Aircrew Ensemble - Navy	8.2			-
Joint RAAWS Ammo Upgrade I-HEAT, TPT - SOCOM	20	\$1,800 per HEAT round	1.0 –training costs, TPT	
Joint RAAWS Ammo Upgrade II – HEDP, HE, ADM - SOCOM	30	\$300-\$500 per round		
Less than 3Kw Generator Sets – Army	2.3	33.1	25	2 years
Mine Protected Clearance Vehicle - Army	31.5	2.0	50K per year	-
Mobile Subscriber UHF Radios - Army	6			2 years
NBC Analysis System - USMC	8			3 years
Next Generation Small Loader - USAF	12			2 years
Passenger Anti-Exposure Survival Suits – Navy	2.3	12 over 10 yrs	30-50% less	-
Scanner Assembly for HTI B-Kit - Army	2.5	13.9		-
Submarine Escape & Immersion Equipment - Navy	9			-
Stealth Screen System - Navy	7 - 8			-

<sup>10</sup> Amounts in then-years dollar estimates.

## INDUSTRIAL TEAMING AND PRODUCTION IN THE U.S.

The FCT Program is frequently a catalyst for teaming or other business relationships between foreign and U.S. industries; many successful FCT projects result in arrangements for the production of the qualified foreign item in the U.S. Other nations recognize the long-term value of such practices for competing in the U.S. defense market and the resultant strengthening of the “two-way street” in defense procurement. For the U.S., the result often means the creation of jobs and contributions to local economies.

**5.56mm Lightweight Machine Gun.** The MK46 Mod0 gun was originally designed and produced by FN Herstal located in Belgium. The latest production of the weapon has been transitioned to Fabrique Nationale Manufacturing, Inc. in Columbia, South Carolina.

**Airtronic Light Oil Burner.** Babington Enterprises Inc. of McLean, Virginia, produces the U.S. Marine Corps’ Tray Ration Heating System. Electrolux Luxembourg, a subsidiary of Electrolux Sweden, is licensed to manufacture and assemble the system’s burner and produces it for Babington.

**Anti-Riot Grenade.** Pains-Wessex (now PW Defence) of the United Kingdom entered into a partnership with New England Ordnance of Guild, New Hampshire, for U.S. production.

**Automatic Chemical Agent Detector Alarm (ACADA) and ACADA Power Supply.** Graseby Dynamics (now Smith’s Detection) of the United Kingdom and ETG of Towson, Maryland, teamed to produce and support delivery of the ACADA and ACADA Power Supplies to the Army, Navy, Air Force, Marines, and National Guard.

**BOL Chaff Dispenser and F-15 Countermeasures Dispenser (BOL).** The Swedish and United Kingdom manufacturers of the BOL dispenser and BOL chaff, Saab Tech and Chemring respectively, are teamed with BAE Systems North America (formerly TRACOR) in Austin, Texas. Alloy Surfaces of Chester Township, Pennsylvania, a subsidiary of the Chemring Group, is producing expendables for the systems.

**E-2C Multifunction Display Control Unit.** Marconi of Canada teamed with the U.S. E-2C aircraft manufacturer, Northrup Grumman of Bethpage, New York, on the CMA 882 Avionics Management System Program.

**EHF Traveling Wave Tubes.** As a result of the successful FCT testing of its product in 1988, Siemens of Germany teamed with the Raytheon Corporation of Lexington, Massachusetts, on a Navy EHF submarine communications program.

**Electronic Combat Integrated Pylon System.** Per Udsen, the Danish manufacturer of the Electronic Combat Integrated Pylon System, is teamed with Northrup Grumman of Rolling Meadows, Illinois, and Lockheed Martin of Fort Worth, Texas.

**Forward Area Degaussing Range.** Raytheon Naval Systems (formerly Alliant Tech) of Mukilteo, Washington, a U.S. company, provided the acoustic portion for the United Kingdom Forward Area Combined Degaussing and Acoustic Range.

**GIANT Infrared Decoy Rounds.** Buck of Germany, developer of the GIANT Infrared Decoy Rounds used in the Navy’s SRBOC shipboard countermeasures launchers, is teamed with Sippican Inc., of Marion, Massachusetts, for the refurbishment of GIANT rounds currently in inventory to increase their shelf life.

**Heavy Assault Bridge, Leguan.** The Army selected the Germany MAN bridging system in 1994 for Engineering and Manufacturing Development (EMD). MAN teamed with General Dynamics Land Systems of Sterling Heights, Michigan, for the successful FCT evaluation. The system was approved for Low Rate Initial Production in FY 1998 and named the “Wolverine.”

**High Mobility Engineer Excavator.** Australian Defence Industries teamed with Oshkosh Truck Corporation, Wisconsin, for this successful FCT evaluation sponsored by the Army. The vehicles are being produced in Wisconsin.

**Joint Protective Aircrew Ensemble.** Creative Apparel Associates of Belmont, Maine, was awarded a delivery order contract in FY 2002 to manufacture protective garments for System Development and Demonstration, including Low-Rate Initial Production amounts, using materials provided by Blucher GmbH with Theodolf Fritsche GmbH of Germany, which were qualified for procurement in this successful FCT project.

**Lightweight Antitank Weapon M72A5.** Talley Defense, Mesa, Arizona, leads the consortium that includes Raufoss as an original equipment manufacturer, along with BAE Systems North America (formerly TRACOR), Austin, Texas, to produce M72A5 weapons for U.S. Forces.

**Mine Protected Clearance Vehicle.** Denel Mechem of the Republic of South Africa teamed with Technical Solutions Group of Charleston, South Carolina, for the successful FCT evaluation sponsored by the Army. The first vehicles are being manufactured in Charleston.

**Muzzle Velocity System.** The Israeli Reshef contract was awarded to RSL Electronics USA, Inc., Poughkeepsie, New York. Technical Systems Inc., Grand Rapids, Michigan, is producing the muzzle velocity system for the Army.

**Next Generation Small Loader.** FMC Corporation of Orlando, Florida, teamed with Static Engineering of Australia, won the competition in this successful FCT project. Full-rate production has been authorized for 48 loaders, valued at \$150 million, for the Air Force.

**Powered Multifuel Burner.** International Thermal Research, Inc., British Columbia, Canada, teamed with Tech Research Group, Providence, Rhode Island, to submit their candidate for a successful FCT evaluation in meeting this Army and Marine Corps requirement.

**Renaissance View Satellite Data and Eagle Vision.** Northrop Grumman (ERIM International), Ann Arbor, Michigan and Matra CAP Systems (now EADS), Velizy, France teamed on the initial imagery project while IOSAT Corp., Halifax, Nova Scotia, Canada joined for the upgrade to the Eagle Vision Satellite Imagery Receiving and Processing Station.

**Skin and Open Wound Decontamination.** O'Dell Engineering of Canada is teamed with Curtiss Laboratories of Ben Salem, Pennsylvania, and Leominster, Massachusetts, and E-Z-Em, Inc., of Long Island, New York, for the evaluation and potential production of its Reactive Skin Decontamination Lotion for use on skin, open wounds, and equipment. The project is sponsored by the Marine Corps.

**Ultra Lightweight Camouflage Net System.** Diab-Barracuda of Sweden is supplying machinery, equipment, and technical assistance to BAE Systems North America (formerly TRACOR Aerospace) of Lillington, North Carolina, to manufacture the camouflage net system to meet Army requirements.

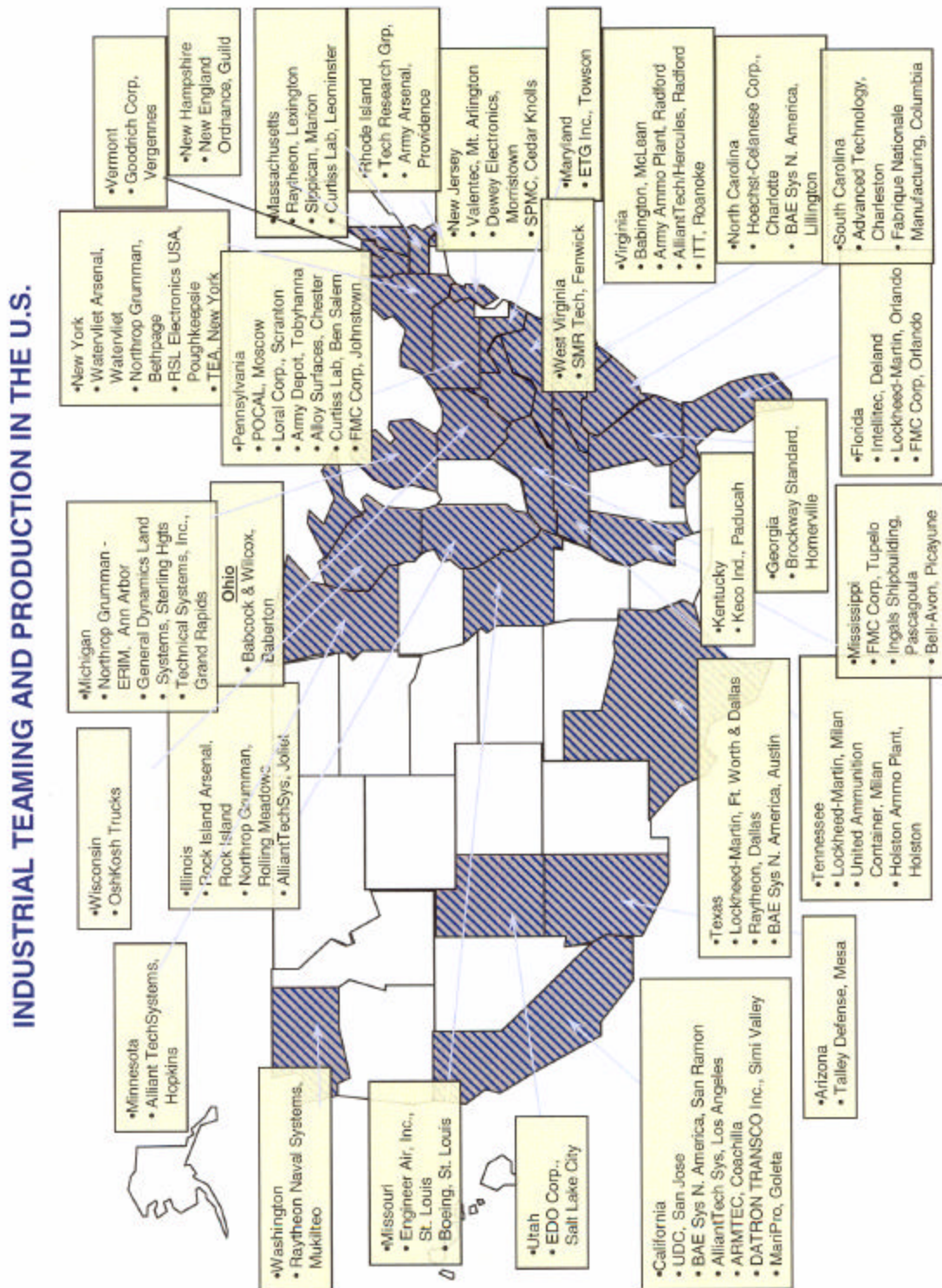


Figure D-2. Industrial Teaming and Production in the U.S.



## FCT TESTING &amp; PROJECT MANAGEMENT LOCATIONS IN THE U.S.

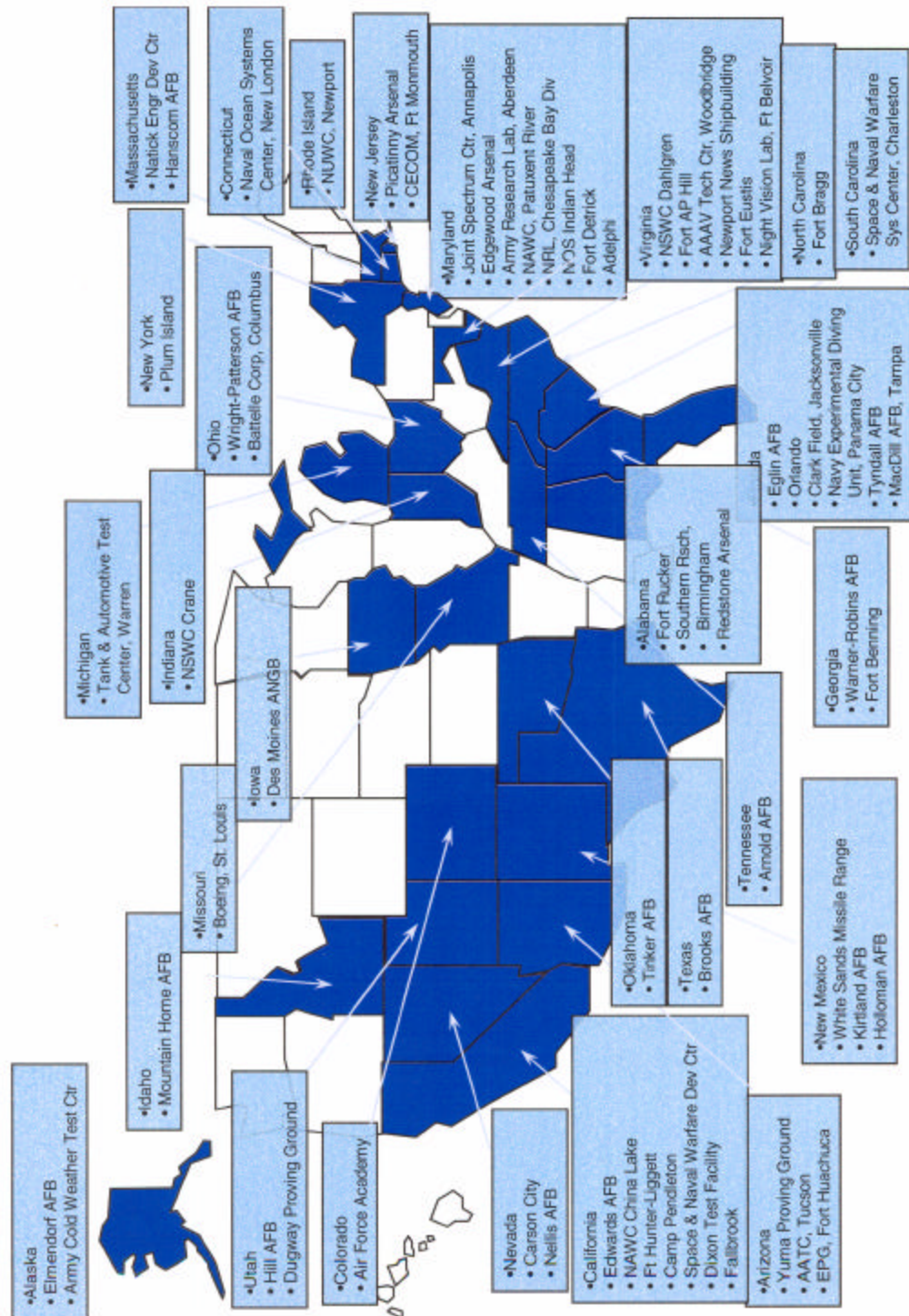


Figure D3. FCT Testing and Project Management Locations in the U.S.

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